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UNITED STATES
DEPARTMENT OF AGRICULTURE
MISCELLANEOUS PUBLICATION NO. 371

Washington, D. C.

March 1940

A REVISION OF THE NORTH AMERICAN APHIDS OF THE GENUS MYZUS¹

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INTRODUCTION

A systematic study of the North American species of the aphid genus *Myzus* Passerini is presented in this publication. It brings together the known species, listing their hosts and giving their distributions, the locations of their types, and descriptions, drawings, and keys for their separation.

No comprehensive review of the group has been available. In other parts of the world *Myzus* has been discussed by different authors. The more important studies are by Buckton (4)³, Theobald (33), Davidson (6), and Hille Ris Lambers (14) in England; Van der Goot (12, 13) in the Netherlands and Java; Mordvilko (18) and Nevsky (19, 20) in the Union of Soviet Socialist Republics; Takahashi (21, 28, 29, 30, 31, 32) in the Orient; and Blanchard (2) in South America. Certain American investigators, as Gillette and Palmer in Colorado (10) and Hottes and Frison in Illinois (17), have published valuable papers on the species of their own States, but the North American species as a whole have never been treated in a single publication. Since the United States National Museum collection contains specimens of some undescribed species and since the writer has had the opportunity of seeing specimens of all the species known from North

¹ Order Hemiptera, superfamily Aphioidea.

² The drawings of figures 1, A-K; 2, A-G; 4, A-D; 5, 6, A-D; and 7, A-H were made by Amy Awl and the others by H. B. Bradford.

³ Italic numbers in parentheses refer to Literature Cited, p. 21.

America, it has seemed desirable that a revision be published to make this information available to students of the group.

Several species in the genus are of considerable economic importance to growers of fruit, truck crops, and ornamental plants, as indicated by the following illustrations:

Myzus cerasi (F.), the black cherry aphid, is abundant on cherry trees almost everywhere. The eggs hatch very early in the spring and the young aphids feed upon the buds, withstanding even freezing weather. When the leaves unfold they are curled by the aphids. Conspicuous leaf clusters are thus formed, within which the insects feed.

Myzus persicae (Sulz.), the green peach aphid, is a common form upon peach trees in the spring. It is often found in large numbers crowded on the under sides of the leaves. During the summer its secondary hosts include many truck-crop and ornamental plants.

Myzus varians David, sometimes severely injures peach trees in the western part of the United States. Colonies are formed on the tender terminal twigs. The tightly rolled leaves, with their reddish tinge, suggest leaf curl. During the summer the species lives on *Clematis*.

Myzus scammelli, new species, is reported as often injurious to cranberries in New Jersey and the New England States.

Myzus eriobotryae Tissot and *M. sensoriatus*, new species, are both found on *Crataegus* and are potentially of importance to apple trees. The former has been reported by Tissot from apple and loquat.

Myzus lythri (Schrank) is found on plum and *Prunus mahaleb*.

Myzus convolvuli (Kalt.) is of importance to potato growers and is also found on several truck-crop and ornamental plants as well as upon many weeds.

Myzus hieracii (Kalt.), in Europe, migrates between *Ribes* and lettuce. It is known to occur in the United States on lettuce and is frequently intercepted by plant quarantine officers on lettuce from Europe.

Myzus porosus Sand. is our most common rose aphid, especially in the Southern States and in Mexico. It also lives on strawberries.

Myzus ligustri (Mosley) occasionally causes severe injury to privet hedges, tightly curling the leaves longitudinally.

Myzus circumflexus (Buckt.) is a very common greenhouse species on floral plants and is occasionally found out of doors in flower gardens.

Myzus ornatus Laing has been taken hundreds of times by plant quarantine officials from products entering the United States from Europe. Essig (8) reports it to be established in California. It is said to be very injurious in Europe on many ornamental plants and is potentially a pest of considerable importance in the United States.

In addition to the direct injury they cause to plants some species of the genus are vectors of virus diseases. They have the ability to carry infection to several healthy plants after leaving the diseased host. In some cases the organism is transmitted by the aphids to their offspring even to the fourth generation. *Myzus persicae* is a known carrier of diseases of several different plants; *M. convolvuli* has been proved to transmit virus diseases of the potato plant; and *M. lili*, new species, is suspected of being a vector of diseases of *Lilium candidum*.

SYNONYMY AND DESCRIPTION OF THE GENUS MYZUS

- Myzus* Passerini, Gli Afidi, p. 27, 1860. (Genotype, *Aphis cerasi* Fabricius.)
Rhopalosiphum Passerini, Gli Afidi, p. 27, 1860. (Genotype, *Aphis persicae* Sulzer.)
Macrosiphum Del Guercio, Nuove Rel. R. Staz. Ent. Agr. Firenze, ser. 1, No. 2, p. 159, 1900. (Genotype, *Aphis convolvuli* Kalténbach.)
Myzoides Van der Goot, Tijdschr. Ent. 56 : 84, 1913. (Genotype, *Aphis cerasi* Fabricius.)
Ovatus Van der Goot, Tijdschr. Ent. 56: 84, 1913. (Genotype, *Ovatus mespili* Van der Goot.)
Myzodes Mordvilko, Faune de la Russie . . . , Insectes Hémiptères, v. 1, Aphidodea, livr. 1, p. 52, 1914. (Genotype, *Myzodes tabaci* Mordvilko.)
Neomyzus Van der Goot, Inst. Sci. Buitenzorg, Contrib. Faune Indes Néerland. 1(3): 50, 1917. (Genotype, *Siphonophora circumflexa* Buckton.)
Myzopsis Matsumura, Sapporo Nat. Hist. Soc. Trans. 7:19, 1918. (Genotype, *Myzopsis diervillae* Matsumura.)
Eumyzus Shinji, Lansania 1: III, 1929. (Genotype, *Aphis impatiensae* Shinji.)
Submacrosiphum Hille Ris Lambers, Mem. Mus. Stor. Nat. Venezia Trident. 1: 22, 1931. (Genotype, *Aphis hieracii* Kalt.)

Baker (1, p. 57) published on the synonymy of the genus. The following changes in his arrangement appear advisable:

(1) *Macrosiphum* Del Guercio, 1900, is added, since the genotype, *Aphis convolvuli* Kalt., is included in this publication as a *Myzus*. Baker considered *convolvuli* to be an *Amphorophora*. *Macrosiphum* Del Guercio should not be confused with *Macrosiphum* Passerini, 1860 (genotype, *Aphis rosae* L.).

(2) *Aulacorthum* Van der Goot, included by Baker as a synonym of *Myzus*, is omitted, since the genotype, *Aphis pelargonii* Kalt., is considered as belonging to *Macrosiphum* Pass.

(3) *Eumyzus* Shinji and *Submacrosiphum* Hille Ris Lambers were described after the publication of Baker's paper.

Hottes (16, p. 68) suggests that *Myzus* is a synonym of *Dactynotus* Rafinesque. He states that *Aphis hieracium-paniculatum* (type of *Dactynotus*) is synonymous with *A. hieracii* Schr., a species included in this publication. On the other hand, Börner (3, p. 185) suggests that *hieracium-paniculatum* Raf. and *Aphis rudbeckiae* Fitch are synonymous. Fitch's species is a *Macrosiphum* (*Tritogenaphis*). Since *Myzus* is so well known in literature, and since Rafinesque's species is uncertain, the writer is retaining the name for the present, as has also been done by Gillette and Palmer (10).

When he originally proposed the name *Myzus*, Passerini did not formally describe the genus, but simply included it in a key of genera, for the species *cerasi* Kalt., it being therefore a monobasic genus. Three years later he characterized it as follows (22, p. 21): "Antennae basi distantes tuberculo brevi insidentes, articulo primo haud dentato. Nectaria cylindrica cauda longiora; coeterum ut priora."

Since that time the genus has been defined by others, notably by Baker (1, p. 57) and by Börner (3, p. 140).

Following is a detailed description of the genus as it is treated in this publication:

Antenna.—The antenna is six-segmented, with circular or subcircular sensoria, and with hairs which are shorter than the width of the segments and which may be slightly capitate.

Antennal tubercles.—The antennal tubercles are always convergent and usually imbricated, especially in the apterous form. The degree of convergence varies greatly in different species.

Frontal process.—In some species there is a frontal process between the antennal tubercles. This group of species, which includes *porosus* Sand., *hieracii* (Kalt.), *lili*, new species, and *scammelli*, new species, may deserve segregation as a subgenus of *Myzus*. The name *Submacrosiphum* Hille Ris Lambers is available for such a subgenus.

Beak.—The length of the beak varies greatly in different species. In some it reaches barely beyond the anterior coxae, whereas in others it surpasses the posterior coxae.

Wings.—The wing venation is of the normal aphid type.

Cornicles.—Passerini characterized the cornicles as cylindrical. Baker stated that they are "rather long and subcylindrical." In *persicae* (Sulzer), which most authorities have accepted as belonging to *Myzus*, the cornicles are cylindrical in the spring forms on the primary host but are conspicuously swollen in the forms on the secondary hosts. This species serves as an entering wedge for the admission to the genus of other species with swollen cornicles. Several such species have already been placed in the genus by various writers. In this publication considerable latitude has been allowed with respect to the degree of dilation of the cornicles. This is the same principle that was followed in the writer's paper on the genus *Amphorophora* Buckton.

Cauda.—The cauda is conical, typically short, and very little constricted, but in certain species it is longer and somewhat more constricted. There are usually two to three sets of lateral hairs, but in a few species as many as five sets.

The genus belongs to the Macrosiphina, which is one of the largest and most important groups of the tribe Aphidini. It can be separated from other genera of Macrosiphina by the convergent antennal tubercles.

Twenty species, including three which are here described as new, are included in the genus. Several more species are known from other parts of the world.

In large part the species are known only from plants which are undoubtedly their secondary hosts. Most of the known primary hosts are rosaceous plants. It is possible, if not probable, that the genus will some day be restricted to those species which live primarily upon rosaceous plants or did at one time in their evolution. The secondary hosts include a great variety of plants, and some species of *Myzus* seem to feed on several, or even numerous, secondary hosts, whereas other species, so far as known, are found only on one host species.

The distribution of the genus at the present time is world-wide. When the primary hosts are considered, however, the evidence shows that *Myzus* is essentially confined to temperate or subtropical regions. Some species, such as *persicae* (Sulz.), have been carried in commerce and have become established over practically the entire world where aphids can live, but they are living on their secondary hosts. The genus probably originated in the North Temperate Zone on rosaceous plants.

KEYS TO THE NORTH AMERICAN SPECIES OF MYZUS

The following keys will help to separate the species. Roman numerals refer to antennal segments; for example, III means antennal segment III. The length of the cauda includes the soft part.

ALATE VIVIPAROUS FEMALES

- | | |
|---|---|
| 1. Cornicle distinctly swollen..... | 2 |
| Cornicle not distinctly swollen..... | 7 |
| 2. Abdomen with large, dark, dorsal area <i>persicae</i> (Sulzer) (in part), p. 15. | |
| Abdomen without such area..... | 3 |
| 3. V with sensoria..... | 4 |
| V without sensoria..... | 5 |

4. Unguis about twice as long as base of VI; cornicle about three times as long as cauda.....*sensoriatus*, new species, p. 19.
- Unguis about four times as long as base of VI; cornicle about two and one-half times as long as cauda.....*eriototryae* Tissot, p. 9.
5. III with 6 to 12 sensoria; IV with 0 to 4 sensoria..... 6
- III with 22 to 25 sensoria; IV with 4 to 8 sensoria. On *Ligustrum* and *Euonymus*.....*ligustri* (Mosley), p. 12.
6. Cornicle strongly swollen; IV usually with sensoria. On *Monarda monardae* (Davis), p. 14.
- Cornicle slightly swollen at tip; IV without sensoria. On *Plantago plantagineus* Passerini (in part), p. 17.
7. IV with sensoria..... 8
- IV without sensoria..... 11
8. III with 30 to 42 sensoria; IV with 7 to 14 sensoria
hieracii (Kaltenbach), p. 10. 9
- III with 12 to 20 sensoria; IV with 0 to 10 sensoria..... 9
9. Cornicle longer than width of head across eyes; IV with 5 to 10 sensoria. On rose or strawberry.....*porosus* Sanderson, p. 18.
- Cornicle less than width of head across eyes; IV with 0 to 5 sensoria..... 10
10. Cornicle more than twice as long as cauda; species black
cerasi (Fabricius) (in part), p. 6.
- Cornicle less than twice as long as cauda; species lighter in general color.....*circumflexus* (Buckton) (in part), p. 7.
11. Dark brown or black species..... 12
- Lighter species..... 13
12. Black; cornicle about three times as long as cauda
cerasi (Fabricius) (in part), p. 6.
- Brown; cornicle about twice as long as cauda.....*wakibae* (Hottes), p. 20.
13. Abdomen with dark dorsal patch or bars..... 14
- Abdomen without such patch or bars..... 23
14. Abdomen with dark dorsal patch..... 15
- Abdomen with dark transverse bars..... 22
15. Cornicle less than twice as long as cauda..... 16
- Cornicle two to three times as long as cauda..... 17
16. Unguis much longer than III; III with 14 to 20 sensoria
circumflexus (Buckton) (in part), p. 7.
- Unguis subequal to III; III with 8 to 14 sensoria
persicae (Sulzer) (in part), p. 15.
17. Unguis subequal in length to cornicle..... 18
- Unguis considerably longer than cornicle..... 20
18. Cornicle about twice as long as cauda.....*ornatus* Laing, p. 14.
- Cornicle about two and one-half times as long as cauda..... 19
19. III with 5 to 9 sensoria.....*langei* Essig, p. 11.
- III with 13 to 18 sensoria.....*lythri* (Schränk), p. 13.
20. Cornicle slightly reticulated. On lily.....*lilii*, new species, p. 12.
- Cornicle not reticulated..... 21
21. Unguis over four times as long as base. On peach or *Clematis varians* Davidson, p. 20.
- Unguis four or less times as long as base. On numerous plants
persicae (Sulzer) (in part), p. 15.
22. Cornicle uniform in color, imbricated throughout, less than twice as long as cauda; III with 5 to 8 sensoria
leucocrini Gillette and Palmer, p. 11.
- Cornicle darker at tip, with slight reticulations or striae near flange, more than twice as long as cauda; III with 8 to 17 sensoria
convolvuli (Kaltenbach), p. 8.
23. Unguis about twice as long as cornicle; antennal tubercles strongly convergent. On *Plantago* spp. *plantagineus* Passerini (in part), p. 17.
- Unguis little longer than cornicle; antennal tubercles hardly convergent. On cranberry.....*scammelli*, new species, p. 18.

APTEROUS VIVIPAROUS FEMALES

1. Cornicle distinctly swollen..... 2
- Cornicle not swollen..... 5
2. Length of cauda subequal to distance between antennal tubercles. On *Monarda* spp.*monardae* (Davis), p. 14.
- Length of cauda much greater than distance between antennal tubercles. On other hosts..... 3

3. Length of cauda about three times distance between antennal tubercles-----*persicae* (Sulzer) (in part), p. 15. Length of cauda about twice distance between antennal tubercles----- 4
4. Distal half of cornicle dark; unguis about four times as long as base of VI; on *Ligustrum* and *Euonymus*-----*ligustri* (Mosley), p. 12. Cornicle uniform in color; unguis about two and one-half times as long as base of VI. On *Scrophularia*-----*scrophulariae* (Thomas), p. 19.
5. General color dark----- 6
General color lighter----- 7
6. Black; cornicle three or more times as long as cauda
cerasi (Fabricius), p. 6.
Brown; cornicle about twice as long as cauda. On *Pedicularis wakibae* (Hottes), p. 20.
7. Thorax and abdomen with dark cross bars or dark areas----- 8
Thorax and abdomen without dark cross bars or dark areas----- 11
8. Antenna definitely shorter than body----- 9
Antenna subequal to or slightly longer than body----- 10
9. Antenna hardly half as long as body; unguis about twice as long as base of VI; cornicle slightly more than twice as long as cauda
ornatus Laing, p. 14.
Antenna much longer; unguis three times as long as base of VI; cornicle about three times as long as cauda-----*langei* Essig, p. 11.
10. III with 7 to 21 sensoria; vertex produced forward into a rounded process-----*hieracii* (Kaltenbach), p. 10.
III with one or no sensoria; vertex normal
circumflexus (Buckton), p. 7.
11. Vertex produced forward into a rectangular process----- 12
Vertex not produced forward into a rectangular process----- 14
12. III with 7 to 11 sensoria. On rose or strawberry
porosus Sanderson, p. 18.
13. III without sensoria----- 13
13. Cornicle about three times as long as cauda, much longer than width of head across eyes. On lily-----*lili*, new species, p. 12.
Cornicle less than twice as long as cauda, usually shorter than width of head across eyes. On cranberry-----*scammelli*, new species, p. 18.
14. Distal half of cornicle black-----*varians* Davidson, p. 20.
Cornicle uniform in color----- 15
15. Cauda with four or five hairs on each side; cornicle slightly constricted at middle. On *Leucocrinum*-----*leucocrini* Gillette and Palmer, p. 11.
Cauda with two or three hairs on each side; cornicle not constricted... 16
16. Antennal tubercles very large, only moderately convergent
convolvuli (Kaltenbach), p. 8.
Antennal tubercles smaller, strongly convergent----- 17
17. Cornicle shorter than unguis, slender. On *Plantago* spp
plantagineus (Passerini), p. 17.
Cornicle longer than unguis, stouter----- 18
18. Cornicle two or more times as long as unguis, three or more times as long as cauda-----*lythri* (Schrank), p. 13.
Cornicle slightly longer than (but never twice as long as) unguis, about twice as long as cauda-----*persicae* (Sulzer) (in part), p. 15.

DESCRIPTIONS OF SPECIES

MYZUS CERASI (Fabricius)

(Fig. 1, A-F)

- Aphis cerasi* Fabricius, Systema Entomologiae, p. 735, 1775; Müller, Zoologiae Danicae Prodromus . . . , p. 110, 1776.
- Aphis aparines* Kaltenbach, Monographie der Familien der Pflanzenläuse, p. 46, 1843.
- Aphis asperulae* Walker, Zoologist 6: 2248, 1848.
- Aphis euphrasiae* Walker, Zoologist 7: app. li, 1849.
- Myzus cerasi* (Fabricius) Passerini, Gli Afidi, p. 27, 1860.
- Myzoides cerasi* (Fabricius) Van der Goot, Tijdschr. Ent. 56: 84, 1913.
- Myzus quasipyrrinus* Theobald, Aphididae of Great Britain, v. 3, p. 337, 1929.
- Stem mother*.—Antenna shorter than body, five-segmented; I and II dark somewhat imbricated; III light, darker toward tip; IV and V dark; hairs minut, and not numerous; no secondary sensoria. Length of antennal segments: III,

0.29 to 0.38 mm.; IV, 0.14 to 0.21 mm.; V, base 0.10 to 0.14 mm., unguis 0.14 to 0.18 mm. Antennal tubercles short, broad, imbricated; distance between them 0.10 to 0.11 mm. Head 0.39 to 0.46 mm. across eyes. Beak reaching posterior coxae. Abdomen with lateral dark patches. Cornicle 0.35 to 0.46 mm. in length, dusky, somewhat curved, heavily imbricated throughout. Cauda 0.14 to 0.21 mm. long, conical, not constricted, dark, and with two hairs on each side.

Alate viviparous female.—General color black. Antenna longer than body, dark, heavily imbricated; hairs inconspicuous; III with 12 to 20 sensoria along the entire length, not in a row; IV occasionally with 1 sensorium. Length of antennal segments: III, 0.38 to 0.51 mm.; IV, 0.21 to 0.37 mm.; V, 0.19 to 0.27 mm.; VI, base 0.10 to 0.14 mm., unguis 0.34 to 0.53 mm. Antennal tubercles small, slightly convergent, plainly imbricated; distance between them 0.05 to 0.10 mm. Head polished black, 0.34 to 0.42 mm. across eyes. Femora and tibiae dull yellow, the apices black; tarsi black. Abdomen blackish brown, with greenish tinge. Cornicle 0.30 to 0.40 mm. in length, polished black, cylindrical, heavily imbricated, distinctly flanged. Cauda 0.11 to 0.16 mm. long, somewhat constricted, thickly covered with dark sclerotic points, and with 3 hairs on each side.

Apterous viviparous female.—General color black or purplish black, the head somewhat paler. Antenna slightly shorter than body, imbricated; no secondary sensoria; III to V yellowish white; remainder of antenna black. Length of antennal segments: III, 0.25 to 0.48 mm.; IV, 0.16 to 0.31 mm.; V, 0.14 to 0.23 mm.; VI, base 0.09 to 0.13 mm., unguis 0.21 to 0.40 mm. Antennal tubercles strongly convergent, heavily imbricated; distance between them 0.05 to 0.09 mm. Head 0.34 to 0.46 mm. across eyes. Beak reaching to posterior coxae. Prothorax with a small tubercle on each side. Femora mostly dusky, the bases dirty yellow; tibiae dirty yellow, the tips black. Abdomen with small lateral tubercles. Cornicle 0.33 to 0.58 mm. in length, slender, heavily imbricated, distinctly flanged. Cauda 0.11 to 0.15 mm. long, triangular, and with three hairs on each side.

Type.—Location unknown. The types of *asperulae* Walker, *euphrasiae* Walker, and *quasipyritus* Theobald are in the British Museum.

Hosts.—*Prunus* spp., *Galium* spp., *Lepidium* spp., *Asperula odorata*, *Euphrasia officinalis*, and pear.

Distribution.—North America, Europe, and Australia.

This species, which is the type of *Myzus*, has appeared in taxonomic literature many times, the most helpful discussions being by Gillette (9, p. 362), Van der Goot (12, p. 168), Theobald (33, p. 292), Gillette and Palmer (10, p. 201), and Hottes (15). Hille Ris Lambers (14, v. 3, p. 33) is being followed in placing *quasipyritus* Theobald as a synonym, since he has studied Theobald's type.

This species may continue throughout the year on cherry, where it is often of considerable economic importance. Usually, however, there is a partial or complete migration to secondary hosts. The biology has been well discussed by Gillette and Taylor (11, p. 42), Ross (26, 27), Quaintance and Baker (25, p. 20), Wimshurst (35, p. 85), Theobald (33, p. 292), Hottes and Frison (17, p. 335), and Gillette and Palmer (10, p. 201).

MYZUS CIRCUMFLEXUS (Buckton)

(Fig. 1, G-K)

- Siphonophora circumflexa* Buckton, Monograph of the British Aphides, v. 1, p. 130, 1876.
Nectarophora circumflexa (Buckton) Hunter, Iowa Agr. Expt. Sta. Bull. 60: 113, 1901.
Macrosiphum circumflexum (Buckton) Schouteden, Mem. Soc. Ent. Belg. 12: 238, 1906.
Myzus vincae Gillette, Canad. Ent. 40: 19, 1908.
Siphonophora callae Henrich, Verhandl. u. Mitt. Siebenburg. Ver. Naturw. Hermannstadt 59: 26, 1909.
Myzus circumflexum (Buckton) Davis, Canad. Ent. 46: 121, 1914.
Neomyzus circumflexum (Buckton) Van der Goot, Inst. Sci. Buitenzorg, Contrib. Faune Indes Néerland. 1 (3): 50, 1917.
Aulacorthum circumflexum (Buckton) Hille Ris Lambers, Stylops 2: 174, 1933.

Alate viviparous female.—Antenna longer than body, dusky; imbrications distinct; hairs small; III with 14 to 20 sensoria, more or less in a row; IV with 0 to 4 sensoria. Length of antennal segments: III, 0.43 to 0.58 mm.; IV, 0.40 to 0.53 mm.; V, 0.35 to 0.40 mm.; VI, base 0.15 to 0.24 mm., unguis 0.50 to 0.79 mm. Antennal tubercles not distinctly convergent; distance between them, 0.08 to 0.09 mm. Head 0.40 to 0.44 mm. across eyes. Beak extending nearly to posterior coxae. Abdomen with a large, dorsal, dark area and several lateral, dark patches. Cornicle 0.28 to 0.36 mm. in length, slender, dusky, imbricated. Cauda 0.15 to 0.19 mm. long, broad, dusky, and with 3 rather prominent hairs on each side.

Apterous viviparous female.—Antenna slightly longer than body, dusky; hairs small; one or no secondary sensoria. Length of antennal segments: III, 0.39 to 0.63 mm.; IV, 0.26 to 0.49 mm.; V, 0.23 to 0.39 mm.; VI, base 0.12 to 0.18 mm.; unguis 0.50 to 0.79 mm. Antennal tubercles of moderate size, imbricated, strongly convergent; distance between them 0.05 to 0.08 mm. Head 0.33 to 0.43 mm. across eyes. Beak reaching almost to posterior coxae. Prothorax and abdomen with large, dark, somewhat broken patches, the abdominal patch usually having several irregular light areas. Cornicle 0.28 to 0.43 mm. in length, cylindrical, dusky, imbricated. Cauda 0.15 to 0.20 mm. long, broad, and having 2 or 3 rather inconspicuous hairs on each side.

Type.—In the British Museum.

Hosts.—Nearly all greenhouse floral plants.

Distribution.—North America, South America, Europe, and Taiwan (Formosa).

This is a very common greenhouse species and is also occasionally found out of doors. The sexual forms are not known. It will live viviparously in greenhouses for several years.

MYZUS CONVOLVULI (Kaltenbach)

(Fig. 2, A-G)

Alphis convolvuli Kaltenbach, Monographie der Familien der Pflanzenläuse, p. 40, 1843.

Aphis vincae Walker, Ann. and Mag. Nat. Hist. (2) 2: 429, 1848.

Siphonophora convolvuli (Kaltenbach) Buckton, Monograph of the British Aphides, v. 1, p. 148, 1876.

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Macrosiphum piceaella Theobald, Entomologist 49: 146, 1916.

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Myzus gei Theobald, Entomologist 52: 157, 1919.

Myzus mercurialis Theobald, Entomologist 52: 158, 1919.

Amphorophora convolvuli (Kaltenbach) Baker, U. S. Dept. Agr. Bull. 826: 55, 1920.

Myzus pseudosolani Theobald, So. East. Agr. Col., Wye, Advisory and Research Dept. [Bull. 1]: 8, 1922.

Myzus glaucii Theobald, Ent. Monthly Mag. 59: 103, 1923.

Myzus hydrocotylae Theobald, Ent. Monthly Mag. 61: 73, 1925.

Myzus convolvuli (Kaltenbach) Davidson, A List of British Aphides, p. 22, 1925; Knowlton, Ann. Ent. Soc. Amer. 30: 313, 1937.

Myzus piceaellus (Theobald) Theobald, Aphididae of Great Britain, v. 1, p. 315, 1926.

Myzus polyanthi Theobald, Aphididae of Great Britain, v. 1, p. 341, 1926.

Myzus veronicellus Theobald, Aphididae of Great Britain, v. 1, p. 347, 1926.

Macrosiphum matsumuraeanum Hori, Hokkaido Agr. Expt. Sta. Rept. 17: 51-83, 1926.

Alate viviparous female.—Antenna longer than body, dusky, distinctly imbricated; hairs distinct; III with a row of 8 to 17 sensoria along the entire length. Length of antennal segments: III, 0.60 to 0.78 mm.; IV, 0.51 to 0.70 mm.; V, 0.45 to 0.59 mm.; VI, base 0.18 to 0.23 mm., unguis 0.63 to 1.03 mm. Antennal

tubercles very large, moderately convergent; distance between them 0.10 to 0.11 mm. Head 0.43 to 0.50 mm. across eyes. Beak reaching to between the middle and posterior coxae. Abdomen with dusky, more or less broken cross bands and with dark lateral patches. Cornicle 0.46 to 0.60 mm. in length, slender, the tip dark and tending to be reticulated. Cauda 0.18 to 0.26 mm. long, pale, constricted, and having 2 or 3 hairs on each side.

Apterous viviparous female.—Antenna longer than body, pale, tips of segments darker; hairs short and heavy, somewhat capitate; III with one to three sensoria. Length of antennal segments: III, 0.56 to 0.76 mm.; IV, 0.49 to 0.63 mm.; V, 0.38 to 0.50 mm.; VI, base 0.16 to 0.20 mm., unguis 0.58 to 1.00 mm. Antennal tubercles very large, moderately convergent; distance between them 0.09 to 0.12 mm. Beak reaching to posterior coxae. Abdomen without dark markings. Cornicle 0.44 to 0.69 mm. in length, the tip dusky and somewhat reticulated. Cauda 0.21 to 0.29 mm. long, pale, conical, with slight constrictions, and with three hairs on each side.

Type.—Location unknown. The types of Theobald's synonyms are in the British Museum. The type of *matsumuraeanum* Hori is at the Hokkaido Agricultural Experiment Station, Kotoni, Japan; metatypes are in the United States National Museum collection.

Hosts.—A large number of herbaceous plants; also reported on certain woody plants, including apple, pear, hawthorn, raspberry, *Althaea*, and *Hydrangea*.

Distribution.—North America, Europe, and Japan.

This species, commonly known as *Myzus pseudosolani* Theobald, is much confused in the literature. In placing a number of Theobald's species as synonyms the writer has followed Hille Ris Lambers (14), who has studied Theobald's types. Specimens of *matsumuraeanum* Hori, received from the author of the species, show that this also is a synonym.

This species is not typical of the genus *Myzus*. The antennal tubercles are longer on the outside and less conspicuously convergent on the inside than in the more typical species. The long, slender cornicles, with faint reticulations at the tips, are suggestive of the genus *Macrosiphum*. The writer is of the opinion, however, that it comes closer to *Myzus* than to *Macrosiphum*.

The biology of this important aphid pest has been well discussed by Patch (23). She collected it on 72 different plants of 31 botanical families. It is especially important to potato culture. Patch found that the eggs are laid on common foxglove (*Digitalis purpurea* L.), and for this reason gave it the common name, foxglove aphid. Specimens of *matsumuraeanum* received from Hori include apterous oviparous females and alate males taken on potato in Japan.

MYZUS ERIOBOTRYAE Tissot

(Fig. 1, *L* and *M*; fig. 2, *H*)

Myzus eriobotryae Tissot, Fla. Ent. 18: 49-52, 1935.

Alate viviparous female.—Described from the holotype. Antenna slightly longer than body, dark; hairs short; sensoria moderately tuberculate, distributed as follows: 55 on III, 31 on IV, 12 on V; I projecting inward strongly. Length of antennal segments: III, 0.73 mm.; IV, 0.48 mm.; V, 0.39 mm.; VI, base 0.15 mm., unguis 3.58 mm. Antennal tubercles moderately convergent; distance between them 0.10 mm. Head 0.48 mm. across eyes. Abdomen brown, without conspicuous markings. Cornicle 0.36 mm. in length, dusky, swollen, suggestive of that of *persicae*. Cauda 0.15 mm. long, conical, barely constricted, tip rounded, and with 2 hairs on each side.

Male.—Described from the allotype. Antenna longer than body, dark; hairs inconspicuous; sensoria somewhat tuberculate, distributed as follows: 45 to 46 on III, 25 to 26 on IV, 12 to 13 on V. Length of antennal segments: III, 0.49 mm.; IV, 0.37 to 0.38 mm.; V, 0.30 to 0.31 mm.; VI, base 0.13, unguis 0.58 to 0.59 mm.

Antennal tubercles moderately convergent; distance between them 0.09 mm. Head 0.45 mm. across eyes. Beak reaching beyond the posterior coxae. Abdomen without conspicuous markings. Cornicle 0.25 mm. in length, swollen, slightly darker than abdomen. Cauda 0.08 mm. long, conical, not constricted, and with 2 hairs on each side.

Type.—Holotype, alate viviparous female, and allotype, male, both taken on loquat; deposited in the United States National Museum (catalog No. 44301). Paratypes in the Florida Agricultural Experiment Station and in the private collection of Tissot.

Hosts.—Loquat, apple, and *Crataegus*.

Distribution.—Florida.

MYZUS HIERACII (Kaltenbach)

(Fig. 3, A-H)

Aphis lactucae Schrank, Fauna Boica, v. 2, p. 120, 1801, preoccupied by *Aphis lactucae* L., 1758.

Aphis hieracii Kaltenbach, Monographie der Familien der Pflanzenläuse, p. 17, 1843.

Aphis ribicola Kaltenbach, Monographie der Familien der Pflanzenläuse, p. 33, 1843.

Siphonophora ribicola (Kaltenbach) Koch, Die Pflanzenläuse Aphiden . . . , p. 194, 1854.

Siphonophora lactucae (Schrank) Passerini, Gli Afidi, p. 34, 1860.

Siphonophora hieracii (Kaltenbach) Buckton, Monograph of the British Aphides, v. 1, p. 126, 1876.

Macrosiphum lactucae (Schrank) Theobald, Jour. Econ. Biol. 7: 102, 1912.

Macrosiphum hieracii (Kaltenbach) Theobald, Jour. Econ. Biol. 8: 86, 1913.

Myzus hieracii (Kaltenbach) Davidson, A List of British Aphides, p. 39, 1925.

Myzus lactucae (Schrank) Davidson, A list of British Aphides, p. 44, 1925.

Submacrosiphum hieracii (Kaltenbach) Hille Ris Lambers, Mem. Mus. Stor. Nat. Venezia Trident. 1: 22, 1931.

Alate viviparous female.—Antenna longer than body, dark; III with 30 to 42 large sensoria along the entire length; IV with 7 to 14 sensoria, more or less in a row; hairs prominent. Length of antennal segments: III, 0.81 to 0.83 mm.; IV, 0.48 to 0.49 mm.; V, 0.40 to 0.41 mm.; VI, base 0.11 mm., unguis 1.35 mm. Distance between antennal tubercles 0.13 mm. Head dark brown to black, with prominent hairs; 0.49 to 0.51 mm. across eyes. Beak extending to between the middle and posterior coxae. Abdomen with dark-colored, irregular cross areas and with dark lateral spots. Cornicle 0.50 to 0.51 mm. in length, cylindrical, dark brown; with a few imbrications at tip, or slightly reticulated. Cauda 0.29 mm. long, dusky, slightly constricted, and with 3 hairs on each side.

Apterous viviparous female.—Yellowish to greenish. Hairs somewhat capitate. Antenna longer than body; light in color, tips of segments and all of VI darker; III with 7 to 26 sensoria, mostly near base. Length of antennal segments: III, 0.56 to 0.81 mm.; IV, 0.33 to 0.55 mm.; V, 0.25 to 0.45 mm.; VI, base 0.10 to 0.14 mm., unguis 0.98 to 1.16 mm. Distance between antennal tubercles 0.14 to 0.15 mm. Head 0.53 to 0.60 mm. across eyes. Vertex produced forward into a rounded process. Beak extending nearly to posterior coxae. Abdomen with more or less broken, dark cross bands. The cornicle 0.50 to 0.66 mm. in length, slender, dark, the tip strongly imbricated. Cauda 0.29 to 0.34 mm. long, broad, slightly constricted, and with 3 sets of lateral hairs.

Type.—Location unknown to writer.

Hosts.—*Ribes*, lettuce, endive, sowthistles, *Crepis virens*, *Cnicus arvensis*, *Lapsana communis*, *Hieracium* spp., *Ballota nigra*, and burdock.

Distribution.—Europe and the United States.

The writer retains this species in the genus *Myzus* for the present, even though in some respects it is not typical. The antennal tubercles are not strongly convergent; the vertex, especially in the apterous form, projects forward too prominently; segment III of the apterae has more sensoria than is usual in the genus; and the cornicles are faintly reticulated.

In Europe *hieracii* migrates between *Ribes* and such summer hosts as lettuce, endive, sowthistles, and other plants listed above. In the United States it has been reported so far only from lettuce.

MYZUS LANGEI Essig

(Fig. 2, I-P)

Myzus langei Essig, Pan-Pacific Ent., 12: 70, 1936.

Described from cotype specimens loaned by Essig.

Alate viviparous female.—Antenna subequal in length to body, dusky; III with five to nine sensoria. Length of antennal segments: III, 0.41 to 0.43 mm.; IV, 0.28 mm.; V, 0.21 to 0.24 mm.; VI, base 0.13 mm., unguis 0.44 to 0.48 mm. Distance between antennal tubercles 0.06 mm. Head across eyes 0.41 to 0.43 mm. Beak extending to between middle and posterior coxae. Abdomen pink or green, with a black dorsal patch and lateral spots. Cornicle 0.35 to 0.38 mm. in length, black, cylindrical, somewhat curved, imbricated, not reticulated. Cauda 0.14 to 0.15 mm. long, black, conical, and with two hairs on each side.

Apterous viviparous female.—Antenna shorter than body; no secondary sensoria; V and VI dusky. Length of antennal segments: III, 0.24 to 0.25 mm.; IV, 0.16 to 0.19 mm.; V, 0.13 to 0.14 mm.; VI, base 0.08 mm., unguis 0.25 to 0.26 mm. Antennal tubercles gibbous; distance between them 0.04 mm. Head 0.39 mm. across eyes. Beak extending beyond middle coxae. Abdomen pinkish or greenish, with faint dark patches along sides and on dorsum caudad of cornicles. Cornicle 0.41 to 0.43 mm. in length, cylindrical, somewhat curved, imbricated, not reticulated; apical half or third dusky to black. Cauda 0.13 to 0.14 mm. long, black, conical, and with two hairs on each side.

Type.—In Essig's collection.

Host.—Water cress (under sides of leaves).

Distribution.—Sonora, Calif.

MYZUS LEUCOCRINI Gillette and Palmer

(Fig. 2, Q-X)

Myzus leucocrini Gillette and Palmer, Ann. Ent. Soc. Amer. 22: 470, 1929; 27:202, 1934.

Redescribed from the type specimens.

Alate viviparous female.—Light green. Antenna longer than body, dusky, distinctly imbricated; III with five to eight rather large sensoria. Length of antennal segments: III, 0.34 to 0.41 mm.; IV, 0.26 to 0.33 mm.; V, 0.25 to 0.29 mm., VI, base 0.13 to 0.14 mm., unguis 0.41 to 0.49 mm. Antennal tubercles moderately convergent; distance between them 0.10 mm. Head 0.35 to 0.40 mm. across eyes. Abdomen with dark lateral areas and dorsal dashes. Cornicle 0.25 to 0.38 mm. in length, dusky, slender, somewhat more narrow at center, distinctly imbricated. Cauda 0.20 mm. long, pale, constricted, and with four or five hairs on each side.

Apterous viviparous female.—Light green to brownish green. Antenna shorter than body, imbricated; dusky, becoming more so toward tip; no secondary sensoria. Length of antennal segments: III, 0.34 to 0.41 mm.; IV, 0.23 to 0.30 mm.; V, 0.25 to 0.30 mm.; VI, base 0.13 mm., unguis 0.35 to 0.41 mm. Antennal tubercles conspicuously convergent; distance between them 0.11 mm. Head across eyes 0.35 to 0.43 mm. Cornicle 0.40 mm. in length, dusky, slender, narrowed at center, distinctly imbricated. Cauda 0.20 mm. long, pale, constricted, and with four or five hairs on each side.

Intermediate.—There is one intermediate on the type slide. It is similar to the apterous form, except for the presence of very small wings, and a row of sensoria, greatly reduced in size, on antennal segment III. Length of antennal segments: III, 0.35 mm.; IV, 0.24 mm.; V, 0.24 mm.; VI, base 0.11 to 0.13 mm., unguis 0.39 to 0.40 mm. Distance between antennal tubercles 0.09 mm. Head across eyes 0.41 mm. Cornicle 0.36 to 0.38 mm. in length. Cauda 0.16 mm. long.

Type.—In United States National Museum (catalog No. 41921). Paratypes in the collection of the Colorado Agricultural Experiment Station.

Host.—*Leucocrinum montanum*.

Distribution.—Colorado.

MYZUS LIGUSTRI (Mosley), new combination

(Fig. 4, A-D)

Aphis ligustri Mosley, Gard. Chron. 1841: 628.*Aphis ligustri* Kaltenbach, Monographie der Familien der Pflanzenläuse, p. 48, 1843.*Rhopalosiphum ligustri* (Kaltenbach) Koch, Die Pflanzenläuse Aphiden, p. 46, 1854.*Siphocoryne ligustri* (Kaltenbach) Van der Goot, Tijdschr. Ent. 56: 93, 1913.*Rhopalosiphoninus ligustri* (Kaltenbach) Theobald, Aphididae of Great Britain v. 1, p. 216, 1926.*Rhopalosiphoninus ligustri* (Mosley) Hottes, Biol. Soc. Wash. Proc. 43: 181, 1930.

Alate viviparous female.—Antenna slightly longer than body, imbricated, brownish; III with 22 to 25 sensoria; IV with 4 to 8 sensoria. Antennal tubercles small, only slightly convergent, not strongly imbricated; distance between them 0.06 to 0.08 mm. Head 0.36 to 0.38 mm. across eyes. Beak short, not reaching middle coxae. Abdomen with dark lateral patches, and with transverse bars which sometimes coalesce. Cornicle 0.28 to 0.31 mm. in length, swollen, greatest diameter 0.06 mm., smallest diameter 0.03 mm., smooth, slightly imbricated back of flange, the distal half darker. Cauda 0.10 to 1.13 mm. long, light colored, triangular, and with 3 hairs on each side.

Apterous viviparous female.—Antenna shorter than body, light colored; no secondary sensoria; hairs and imbrications very inconspicuous. Length of antennal segments: III, 0.33 to 0.40 mm.; IV, 0.19 to 0.25 mm.; V, 0.16 to 0.21 mm.; VI, base 0.09 to 0.10 mm., unguis 0.36 to 0.44 mm. Antennal tubercles large, distance between them 0.06 mm. Head 0.35 to 0.38 mm. across eyes. Beak short, not reaching middle coxae. Cornicle 0.33 to 0.39 mm. in length; strongly swollen; greatest diameter 0.06 to 0.07 mm., smallest diameter 0.03 to 0.04 mm.; smooth, with one or two imbrications at tip; distal half dark. Cauda 0.13 to 0.14 mm. long, pale, broadly triangular, and with two or three hairs on each side.

There is available for study a slide of this species from Ew. H. Rübsaamen, of Berlin, as well as specimens from the United States and Canada.

Type.—Location unknown.

Hosts.—*Ligustrum vulgare* and *Euonymus europaeus*.

Distribution.—United States, Canada, and Europe.

This species is reported as occasionally causing severe injury to privet hedges, tightly curling the leaves longitudinally. From what is known of the biology, a summer migration is indicated to an unknown secondary host.

MYZUS LILII, new species

(Fig. 4, E-H)

Alate viviparous female.—Antenna much longer than body, dusky; III with 12 to 16 sensoria; hairs and imbrications not distinct. Length of segments: III, 0.50 to 0.73 mm.; IV, 0.43 to 0.45 mm.; V, 0.48 to 0.50 mm.; VI, base 0.13 to 0.14 mm., unguis 0.93 to 0.99 mm. Antennal tubercles of medium size, smooth, moderately convergent; distance between them 0.09 to 0.10 mm. Head 0.46 to 0.49 mm. across eyes. Beak extending to between middle and posterior coxae. Abdomen with a large, dark, dorsal patch and with lateral dark areas. Cornicle 0.48 to 0.54 mm. long, imbricated; a few reticulations at tip. Cauda 0.16 to 0.23 mm. long, somewhat constricted, and with 2 hairs on each side.

Apterous viviparous female.—Antenna longer than body; pale, except tip of V and all of VI, which are dark; no secondary sensoria. Length of segments: III, 0.55 to 0.63 mm.; IV, 0.39 to 0.41 mm.; V, 0.34 to 0.39 mm.; VI, base 0.10 to 0.13 mm., unguis 0.70 to 0.88 mm. Antennal tubercles not strongly convergent; distance between them 0.10 to 0.11 mm. Vertex produced forward into a small rectangular process. Head 0.44 to 0.48 mm. across eyes. Beak extending to between the middle and posterior coxae. Cornicle 0.58 to 0.63 mm. long, light colored, not swollen, faintly reticulated. Cauda 0.18 to 0.23 mm. long, broad, tip rounded, pale, and with 2 hairs on each side.

Type.—United States National Museum catalog No. 52853.

Collected by Philip Brierley in connection with virus-transfer work of the Bureau of Plant Industry, United States Department of Agri-

culture. Described from nine alate viviparous females and four apterous viviparous females.

Host.—*Lilium candidum*.

Distribution.—Salem, Oreg.

MYZUS LYTHRI (Schrank)

(Fig. 4, I-R)

Aphis lythri Schrank, Fauna Boica v. 2, p. 115, 1801.

Aphis mahaleb Koch, Die Pflanzenläuse Aphiden, p. 113, 1854.

Myzus lythri (Schrank) Passerini, Aphididae Italicae, p. 26, 1863.

Myzus mahaleb (Koch) Passerini, Aphididae Italicae, p. 26, 1863.

Phorodon humuli var. *mahaleb* (Koch) Buckton, Monograph of the British Aphides, v. 1, p. 168, 1876.

Myzoides lythri (Schrank) Van der Goot, Tijdschr. Ent., 56: 184, 1913.

Myzaphis lythri (Schrank) Van der Goot, Beitrage zur Kenntnis Holländischen Blattläuse, p. 184, 1915.

Stem mother.—Very broad, imbricated. Antenna short; segments III and IV coalescing; hairs inconspicuous; no secondary sensoria. Length of antennal segments: III and IV, 0.26 to 0.28 mm.; V, 0.14 to 0.15 mm.; VI, base 0.11 mm., unguis 0.10 to 0.11 mm. Antennal tubercles almost absent, not convergent. Head 0.56 mm. across eyes. Beak extending to between middle and posterior coxae. Cornicle 0.49 mm. long, imbricated throughout its length, curving outward. Cauda 0.19 mm. long, almost conical, tip rounded, and with 3 hairs on each side.

Spring migrant.—Antenna subequal in length to body, dusky, imbricated; hairs inconspicuous; III with 13 to 18 sensoria along entire length. Length of antennal segments: III, 0.33 to 0.48 mm.; IV, 0.21 to 0.29 mm.; V, 0.17 to 0.21 mm.; VI, base 0.10 to 0.14 mm., unguis 0.35 to 0.44 mm. Antennal tubercles moderately convergent, distance between them 0.10 mm. Head 0.41 to 0.44 mm. across eyes, brown in color. Beak reaching posterior coxae. Abdomen green, with a dark dorsal patch and with lateral dark areas. Cornicle 0.35 to 0.41 mm. in length, dusky, not swollen, slightly imbricated at tip. Cauda 0.15 to 0.18 mm. long, dusky, slightly constricted, and with 3 hairs on each side.

Spring apterous viviparous female.—Green. Antenna much shorter than body, imbricated; hairs inconspicuous, no secondary sensoria. Length of antennal segments: III, 0.35 mm.; IV, 0.21 mm.; V, 0.18 mm.; VI, base 0.10 mm., unguis 0.31 mm. Distance between antennal tubercles 0.11 mm. Head 0.45 mm. across eyes. Cornicle 0.63 mm. long, not swollen, imbricated throughout its length. Cauda 0.18 mm. long, slightly constricted, and with three hairs on each side.

Summer alate viviparous female.—Similar in appearance to spring migrant. Length of antennal segments: III, 0.44 to 0.46 mm.; IV, 0.25 to 0.28 mm.; V, 0.23 to 0.25 mm.; VI, base 0.13 mm., unguis 0.38 to 0.39 mm. Head 0.46 mm. across eyes. Distance between antennal tubercles 0.09 to 0.10 mm. Cornicle 0.34 to 0.38 mm. long. Cauda 0.14 mm. in length.

Summer apterous viviparous female.—Similar in appearance to spring apterous viviparous female. Length of antennal segments: III, 0.13 to 0.20 mm.; IV, 0.09 to 0.13 mm.; V, 0.08 to 0.11 mm.; VI, base 0.06 to 0.08 mm., unguis 0.13 to 0.28 mm. Head 0.29 to 0.34 mm. across eyes. Distance between antennal tubercles 0.06 to 0.09 mm. Cornicle 0.26 to 0.35 mm. long. Cauda 0.09 to 0.13 mm. in length.

Oviparous female.—Somewhat darker than apterous viviparous female. Antenna much shorter than body; V and VI darker than III and IV; hairs inconspicuous. Length of antennal segments: III, 0.16 to 0.20 mm.; IV, 0.11 to 0.13 mm.; V, 0.10 to 0.13 mm.; VI, base 0.06 to 0.10 mm., unguis 0.11 to 0.15 mm. Distance between antennal tubercles 0.10 to 0.11 mm. Head 0.38 to 0.40 mm. across eyes. Cornicle 0.29 to 0.36 mm. long, dusky, imbricated throughout its length, more slender and less curving than in the viviparae. Cauda 0.13 to 0.18 mm. long, dusky, conical, hardly constricted, and with three hairs on each side.

Male.—Gillette and Palmer (10, p. 203) have shown that the male is winged.

Type.—Location unknown to writer.

Hosts.—Plum, *Prunus mahaleb*, *Epilobium adenocaulon*, and *Lythrum lineare*.

Distribution.—Europe and North America.

This little-known species has been confused in the literature. In England Theobald (33, pp. 273 and 344) treated it in one place as *Myzus lythri* (Schr.), and in another under the name *mahaleb*, he placed it as a synonym of *Phorodon humuli* (Schr.). In the United States Pergande's paper (24) was evidently based on *Myzus persicae* (Sulz.). His slides are in the United States National Museum collection and have been studied. Gillette and Palmer (10, p. 203), using the name *Myzus mahaleb* (Koch), appear to be the first definitely to record it from this country. Their slides have been studied by the writer. Other specimens, collected by Baker, are in the United States National Museum collection. Still others, taken by Tissot in Florida on *Lythrum*, have been examined.

This species was collected in the District of Columbia on plum, by Baker, and reared for a few generations on this plant. Gillette and Palmer (10, p. 203) found it in the spring only on *Prunus mahaleb*. In the summer they obtained it from *Epilobium adenocaulon* but did not attempt transfer tests. In Florida, Tissot took it on *Lythrum lineare*.

MYZUS MONARDAE (Davis)

(Fig. 4, S-Z)

Phorodon monardae Williams (nomen nudum), Nebr. Univ. Studies 10: 173, 1910
Rhopalosiphum monardae (Williams) Davis, Nebr. Univ. Studies 11: 288, 1911.

Myzus monardae (Williams) Hottes and Frison, Ill. State Nat. Hist. Survey. Bull. 19: 339, 1931; Gillette and Palmer, Ann. Ent. Soc. Amer. 27: 204, 1934.

Alate viviparous female.—Described from paratypes. Antenna longer than body, dusky; III with six to nine sensoria arranged along entire length; IV with none to four sensoria, usually two. Length of antennal segments: III, 0.44 mm.; IV, 0.33 to 0.36 mm.; V, 0.33 mm.; VI, base 0.13 mm., unguis 0.46 to 0.49 mm. Distance between antennal tubercles 0.09 to 0.10 mm. Head across eyes 0.38 to 0.39 mm. Beak extending beyond middle coxae. Veins smoky. Cornicle 0.34 to 0.35 mm. in length, dusky, swollen, imbricated. Cauda 0.13 to 0.15 mm. long, triangular, constricted, and with two hairs on each side.

Apterous viviparous female.—Described from paratypes. Antenna longer than body, dusky; no secondary sensoria. Length of segments: III, 0.36 to 0.40 mm.; IV, 0.28 to 0.29 mm.; V, 0.28 to 0.29 mm.; VI, base 0.11 to 0.13 mm., unguis 0.38 to 0.43 mm. Antennal tubercles strongly convergent, suggestive of those of *Phorodon*; distance between them 0.09 mm. Head 0.36 to 0.38 mm. across eyes. Beak extending nearly to posterior coxae. Cornicle 0.34 to 0.35 mm. in length, dusky, swollen, imbricated. Cauda 0.10 to 0.13 mm. long, triangular, pale, and with two hairs on each side.

Type.—In the collection of the University of Nebraska (No. 160). Paratypes in the United States National Museum.

Hosts.—*Monarda* spp.

Distribution.—United States.

This is a border-line species between *Phorodon* and *Myzus*. The antennal tubercles of the apterous form have projections similar to those of *Phorodon humuli* (Schr.), but are much smaller and more convergent. Antennal segment I has a bulge on the inner side, but this also is smaller than in *Phorodon*. In most respects, however, it seems to have strong affinities to *Myzus*, and the writer places it here, as has also been done by Hottes and Frison and by Gillette and Palmer.

MYZUS ORNATUS Laing

(Fig. 4, AA-FF)

Myzus ornatus Laing, Ent. Monthly Mag. 68: 52, 1932; Essig, Pan-Pacific Ent. 14: 92, 1938.

Alate viviparous female.—Antenna shorter than body, brown, imbricated; III with 7 to 10 sensoria. Length of antennal segments: III, 0.34 to 0.50 mm.; IV,

0.21 to 0.30 mm.; V, 0.15 to 0.25 mm.; VI, base 0.10 to 0.13 mm., unguis 0.24 to 0.29 mm. Antennal tubercles small; distance between them 0.06 to 0.08 mm. Head 0.34 to 0.40 across eyes. Beak short, not reaching middle coxae. Abdomen green, with a large, dark, dorsal area and smaller dorsal and lateral patches. Cornicle 0.23 to 0.26 mm. in length, cylindrical, slightly narrowed near tip, brown, imbricated. Cauda 0.11 to 0.13 mm. long, triangular, tip rather broad, and with 1 or 2 hairs on each side.

Apterous viviparous female.—Antenna hardly half as long as body, light colored, distinctly imbricated; hairs very indistinct; no secondary sensoria. Length of antennal segments: III, 0.23 to 0.34 mm.; IV, 0.14 to 0.24 mm.; V, 0.13 to 0.18 mm.; VI, base 0.09 to 0.11 mm., unguis 0.16 to 0.21 mm. Antennal tubercles of moderate size, strongly convergent; distance between them 0.04 to 0.06 mm. Head 0.34 to 0.41 mm. across eyes. Abdomen rugose; with broken dark bands and lateral areas. Cornicle 0.30 to 0.38 mm. long, cylindrical, tapering somewhat, slightly curved, imbricated throughout its length. Cauda 0.14 to 0.16 mm. long, rather broad, not constricted, darker than cornicles, and with one or two hairs on each side.

Type.—In the British Museum.

Hosts.—*Viola*, *Dipsacus fullonum*, *Clematis*, *Helenium peregrinum*, *Chrysanthemum*, *Azalea procumbens*, *Veronica* spp., English daisies, primulas, sorrel, cabbage, *Valeriana*, *Hydrangea*, ivy, shamrock, *Pittosporum*, *Helianthemum*, carnations, *Crotalaria anagyroides*, *Achyranthes* sp., *Lantana* sp., *Heliotropium peruvianum*, *Salvia*, *Richardia rehmanni*, *Panax lancasteri*, *Buddleia orientalis*, *Ulmus campestris*, dandelion, *Urtica dioica*, apple, *Geum urbanum*, *Lapsana communis*, *Scabiosa* sp., *Teesdalia nudicaulis*, *Fuchsia elegans*, *Potentilla* sp., *Ranunculus repens*, strawberry, and heliotrope.

Distribution.—England, Scotland, Ireland, Netherlands, and California.

This species, first described as *ornatus* in 1932, has been found so numerous in Europe in such a short time that it seems it must have been described earlier as one of the many species which cannot be definitely recognized from their earlier descriptions. Judging from the large number of specimens received at quarantine in the United States, Europe has been experiencing an epidemic of it in recent years. Essig has reported it as established in California and has deposited specimens from that State in the United States National Museum collection. It is reported to be very injurious in Europe and is potentially a pest of considerable importance to the United States.

MYZUS PERSICAE (Sulzer)

(Fig. 5, A-R)

- Aphis persicae* Sulzer, Abgekürzte Geschichte der Insekten, p. 105, 1776.
Aphis dianthi Schrank, Fauna Boica, v. 2, p. 114, 1801.
Aphis vulgaris Kyber, Germar's Mag. Ent. 1 (2):9, 1815.
Aphis furcipes Rafinesque, Amer. Monthly Mag. and Critical Rev. 1: 361, 1817.
Aphis rapae Curtis, Roy. Agr. Soc. England Jour. 3:53, 1842.
Aphis dubia Curtis, Roy. Agr. Soc. England Jour. 3:54, 1842.
Aphis vastator Smee, The Potato Plant . . . , p. 63, 1846.
Aphis cynoglossi Walker, Zoologist 6:2217, 1848.
Aphis egressa Walker, Zoologist 7: app. xxxviii, 1849.
Aphis redundans Walker, Zoologist 7: app. xxxii, 1849.
Aphis aucta Walker, Zoologist 7: app. xxxiii, 1849.
Rhopalosiphum dianthi (Schrank) Koch, Die Pflanzenläuse Aphiden, p. 42, 1854.
Myzus persicae (Sulzer) Passerini, Gli Afidi, p. 35, 1860.
Aphis persicaecola Boisduval, Essai sur l'Entomologie Horticole, p. 251, 1867.
Siphonophora achyranthes Monell, Bull. U. S. Geol. and Geogr. Survey Ter. 5: 18, 1879.
Rhopalosiphum tulipae Thomas, Ill. State Ent. Rept. 8:80, 1879.
Myzus malvae Oestlund, Minn. State Geol. Rept. 14: 31, 1886.

Myzus achyranthes (Monell) Oestlund, Minn. Geol. and Nat. Hist. Survey Bull. 4: 74, 1887.

Myzus pergandei Sanderson, Canad. Ent. 33: 72, 1901.

Phorodon cynoglossi Williams, Nebr. Univ. Studies 10: 89, 1910.

Rhopalosiphum solani Theobald (not Kaltenschach), Entomologist 45: 165, 1912.

Myzoides persicae (Sulzer) Van der Goot, Tijdschr. Ent. 56: 84, 1913.

Rhopalosiphum betae Theobald, Jour. Bd. Agr. [London] 19: 918, 1913.

Macrosiphum betae (Theobald) Theobald, Jour. Econ. Biol. 8: 153, 1913.

Rhopalosiphum lactucellum Theobald, Bull. Ent. Research 6: 115, 1915.

Macrosiphum achyranthes (Monell) Wilson and Vickery, Wis. Acad. Sci., Arts, and Letters, Trans. 19: 29, 1918.

Rhopalosiphum tuberosellae Theobald, Entomologist 52: 161, 1919.

Amphorophora betae (Theobald) Mason, U. S. Natl. Mus. Proc. 67 (20): 12, 1925.

Stem mother.—Pinkish red with brown stripes across head, thorax, and anterior part of abdomen; sometimes entire anterior half of body dark brown. Remainder of abdomen green. Antennae and cornicles tipped with black.

Body broad. Antenna much shorter than body, five-segmented; pale, becoming darker toward tip; hairs very small and not numerous; no secondary sensoria. Length of segments: III, 0.29 to 0.43 mm., IV, 0.11 to 0.21 mm.; V, base 0.10 to 0.14 mm., unguis 0.10 to 0.19 mm. Antennal tubercles small, divergent, imbricated; distance between them 0.10 to 0.14 mm. Head 0.36 to 0.46 mm. across eyes. Beak extending to between middle and posterior coxae. Cornicle 0.33 to 0.41 mm. in length, pale, tipped with black, cylindrical, smaller near flange. Cauda 0.18 to 0.24 mm. long, pale, broad, somewhat constricted, and with three hairs on each side.

Apterous viviparous female on primary host.—Either pale yellow or greenish yellow, often with three indistinct darker stripes on abdomen. Eyes reddish. Tarsi and distal segments of antennae blackish.

Antenna shorter than body, pale; imbrications faint; hairs small; no secondary sensoria. Length of antennal segments: III, 0.24 to 0.39 mm.; IV, 0.19 to 0.29 mm.; V, 0.15 to 0.21 mm.; VI, base 0.10 to 0.13 mm.; unguis 0.26 to 0.35 mm. Antennal tubercles large, strongly convergent, imbricated; distance between them 0.08 to 0.10 mm. Head 0.38 to 0.45 mm. across eyes. Prothorax with small lateral tubercle. Cornicle 0.31 to 0.45 mm. in length, cylindrical, strongly imbricated, somewhat curved; flange conspicuous. Cauda 0.18 to 0.23 mm. long, conical, and with three hairs on each side.

Spring migrant.—Greenish yellow. Head black. Eyes reddish. Antennal tubercles and basal parts of antennae dusky; remainder of antennae darker. Thorax blackish. I and II with narrow, transverse, more or less broken bands; a large, approximately square, dusky spot from III to V; VI and VII with dusky bands. Three large blackish spots cephalad of cornicles. Cornicles and cauda dusky. Legs blackish, bases of femora yellowish.

Antenna slightly longer than body; hairs very inconspicuous; III with 8 to 11 sensoria. Length of antennal segments: III, 0.45 to 0.61 mm.; IV, 0.29 to 0.51 mm.; V, 0.19 to 0.36 mm.; VI, base 0.10 to 0.16 mm., unguis 0.40 to 0.64 mm. Antennal tubercles of moderate size, imbricated, strongly convergent; distance between them 0.06 to 0.10 mm. Head 0.41 to 0.44 mm. across eyes. Beak extending nearly or quite to middle coxae. Lateral dark patches each bearing a tubercle. Two tubercles in front of cauda. Cornicle 0.30 to 0.39 mm. in length, dusky, cylindrical to slightly swollen; 1 or 2 cross imbrications near flange. Cauda 0.16 to 0.24 mm. long, faintly dusky, and with 3 hairs on each side.

Summer apterous form.—Pale green or greenish yellow, with darker dorsal and subsorsal stripes. Antenna pale, apices of segments darker. Legs pale, tarsi dark. Cornicles pale dusky, tips darker. Cauda concolorous with body or pale dusky.

Antenna shorter than body, distinctly imbricated; hairs short and inconspicuous; no secondary sensoria. Length of segments: III, 0.31 to 0.48 mm.; IV, 0.21 to 0.35 mm.; V, 0.16 to 0.29 mm.; VI, base 0.10 to 0.15 mm., unguis 0.35 to 0.49 mm. Antennal tubercles large, conspicuously imbricated, strongly convergent; distance between them 0.04 to 0.08 mm. Head 0.34 to 0.43 mm. across eyes. Beak extending between middle and posterior coxae. Cornicle 0.34 to 0.51 mm. in length; slender, cylindrical to slightly swollen, not conspicuously imbricated, tip darker, flange distinct; one or two cross imbrications near flange. Cauda 0.15 to 0.21 mm. long, broadly conical, and with two or three hairs on each side.

Summer alate form and fall migrant.—Head and thorax dusky to black, lighter parts of thorax often yellowish or reddish. Antenna dusky. Terminal half of femur dusky. Abdomen with a large, rather square, dusky area with lateral projections; dusky bands in front of patch, often somewhat broken; similar

dusky bands caudad of dorsal area; large, black, lateral spots; cornicles and cauda dusky.

Antenna slightly longer than body; hairs inconspicuous; III with 9 to 14 sensoria. Length of segments: III, 0.41 to 0.61 mm.; IV, 0.35 to 0.54 mm.; V, 0.26 to 0.36 mm.; VI, base 0.13 to 0.19 mm., unguis 0.40 to 0.71 mm. Antennal tubercles heavily imbricated, strongly convergent; distance between them 0.05 to 0.08 mm. Head 0.38 to 0.43 mm. across eyes. Cornicle 0.33 to 0.41 mm. in length; distinctly swollen, becoming more so as the season advances; distinct cross imbrications near flange. Cauda 0.15 to 0.21 mm. long, broad, somewhat constricted, and with three hairs on each side.

Male.—Alate. Color same as that of fall migrant, except that dorsal, dusky area may be more or less broken into bands.

Antenna longer than body, faintly dusky, imbrications not distinct; hairs small; III with 26 to 47 sensoria; IV with 15 to 27 sensoria; V with 8 to 16 sensoria. Length of antennal segments: III, 0.43 to 0.63 mm.; IV, 0.35 to 0.49 mm.; V, 0.29 to 0.39 mm.; VI, base 0.13 to 0.19 mm., unguis 0.40 to 0.63 mm. Antennal tubercles strongly convergent; distance between them 0.06 to 0.07 mm. Head 0.40 to 0.44 mm. across eyes. Beak reaching nearly to posterior coxae. Cornicle 0.28 to 0.35 mm. in length; swollen on distal half; distinct cross imbrications near flange. Cauda 0.11 to 0.15 mm. long, somewhat constricted, and with three hairs on each side.

Oviparous female.—Antenna shorter than body, pale basally, distal portion darker. Length of antennal segments: III, 0.26 to 0.34 mm.; IV, 0.24 to 0.30 mm.; V, 0.19 to 0.23 mm.; VI, base 0.11 to 0.13 mm., unguis 0.33 to 0.36 mm. Antennal tubercles conspicuous, imbricated, strongly convergent; distance between them 0.05 to 0.06 mm. Head 0.36 to 0.40 mm. across eyes. Beak almost or quite reaching posterior coxae. Cornicle 0.25 to 0.33 mm. in length, slightly swollen, imbricated; flange prominent; a cross imbrication near flange. Cauda 0.13 to 0.16 mm. long, broadly conical, and with three hairs on each side.

Type.—Location unknown to the writer.

This species alternates between such winter hosts as peaches, plums, apricots, nectarines, and cherries and any one of many summer hosts. It is often injurious to garden plants. In greenhouses and in the Southern States it seems to be able to live indefinitely on the secondary hosts, without oviparous reproduction. It is one of the most cosmopolitan aphids known to the writer, occurring in all parts of the world where aphids will live.

MYZUS PLANTAGINEUS Passerini

(Fig. 6, A-D)

Myzus plantagineus Passerini, Gli Afidi, p. 35, 1860.

Alate viviparous female.—Antenna longer than body, dusky, distinctly imbricated; hairs small and inconspicuous; III with 9 to 12 sensoria. Length of antennal segments: III, 0.34 to 0.39 mm.; IV, 0.24 to 0.31 mm.; V, 0.26 to 0.31 mm.; VI, base 0.14 to 0.15 mm., unguis 0.49 to 0.53 mm. Antennal tubercles large, somewhat imbricated, strongly convergent; distance between them 0.08 mm. Head 0.36 mm. across eyes. Beak hardly reaching middle coxae. Cornicle 0.26 to 0.31 mm. long, slender, slightly swollen at tip, imbricated throughout its length, flange not large. Cauda 0.13 mm. long, narrow, strongly constricted, and with 3 rather inconspicuous hairs on each side.

Apterous viviparous female.—Antenna subequal to length of body, basal half pale, distal half dusky; imbricated; hairs very small and inconspicuous; no secondary sensoria. Length of antennal segments: III, 0.30 to 0.38 mm.; IV, 0.20 to 0.26 mm.; V, 0.21 to 0.26 mm.; VI, base 0.11 to 0.14 mm., unguis 0.40 to 0.45 mm. Antennal tubercles strongly convergent; distance between them 0.06 to 0.09 mm. Head 0.33 to 0.39 mm. across eyes. Beak extending beyond middle coxae. Cornicle 0.30 to 0.36 mm. in length, pale, slender, slightly swollen near tip, flange not prominent. Cauda 0.13 to 0.15 mm. long, broadly conical, and with three hairs on each side.

Type.—Location unknown to the writer.

Hosts.—*Plantago* spp., near the crown of the plants. The colonies are sometimes covered by "tents" made by ants.

Distribution.—Europe and North America.

Specimens determined by Mordvilko as *plantagineus* Pass. were described by Davis (7, p. 495), and those described by Williams (34, p. 149) were later verified by Davis. The specimens on which the above description is based are those which Williams described and which were later deposited in the United States National Museum.

MYZUS POROSUS Sanderson

(Fig 6, E-M)

Myzus porosus Sanderson, Del. Agr. Expt. Sta. Rept. 12:205, 1901.

Alate viviparous female.—Antenna longer than body, dusky; III with 13 to 16 large sensoria. Length of antennal segments: III, 0.63 to 0.65 mm.; IV, 0.45 to 0.49 mm.; V, 0.34 to 0.39 mm.; VI, base 0.14 mm., unguis 0.50 to 0.65 mm. Antennal tubercles moderately convergent; distance between them 0.09 to 0.13 mm. Head 0.43 to 0.45 mm. across eyes. Beak short, hardly reaching middle coxae. Abdomen green. Cornicle 0.49 to 0.54 mm. in length, slender, dusky, imbricated. Cauda 0.24 to 0.30 mm. long, narrow, constricted, suggestive of that of the genus *Macrosiphum*, and with 3 hairs on each side.

Apterous viviparous female.—Green to greenish brown. Antenna slightly longer than body; VI darker in color; III with 7 to 11 sensoria arranged in a straight row. Length of antennal segments: III, 0.63 to 0.69 mm.; IV, 0.43 to 0.49 mm.; V, 0.31 to 0.39 mm.; VI, base 0.10 to 0.13 mm., unguis 0.48 to 0.53 mm. Antennal tubercles large, only moderately convergent, distance between them 0.14 mm. Vertex produced forward into a prominent rectangular process. Head 0.43 to 0.45 mm. across eyes. Beak extending to between middle and posterior coxae. Cornicle 0.55 to 0.68 mm. in length, slender, straight, imbricated. Cauda 0.30 to 0.33 mm. long, constricted, and with 3 hairs on each side.

Type.—United States National Museum Catalog No. 5423.

Hosts.—Rose and strawberry.

Distribution.—North America.

This is our most common aphid on roses, especially in the Southern States. It is intercepted in large numbers by the Bureau's quarantine officers in the inspection of products coming from Mexico. It was originally described from strawberry plants, but it does not seem to be so abundant on this host as on roses. The eggs are laid on both plants.

MYZUS SCAMMELLI, new species

(Fig. 6, N-U)

Alate viviparous female.—Antenna subequal to length of body, dusky; III with seven to nine sensoria along nearly entire length. Length of antennal segments: III, 0.38 to 0.48 mm.; IV, 0.24 to 0.34 mm.; V, 0.23 to 0.33 mm.; VI, base 0.13 to 0.16 mm., unguis 0.34 to 0.48 mm. Antennal tubercles hardly convergent; distance between them 0.10 to 0.13 mm. Head 0.36 to 0.41 mm. across eyes. Cornicle 0.33 to 0.39 mm. in length, slender, straight, imbricated. Cauda 0.18 to 0.20 mm. long, constricted, and with two or three hairs on each side.

Apterous viviparous female.—Antenna subequal in length to body; distal half dark; no secondary sensoria. Length of antennal segments: III, 0.29 to 0.33 mm.; IV, 0.16 to 0.21 mm.; V, 0.18 to 0.20 mm.; VI, base 0.11 to 0.13 mm., unguis 0.29 to 0.31 mm. Antennal tubercles not strongly convergent; distance between them 0.09 to 0.10 mm. Vertex produced forward into a conspicuous, rectangular or somewhat rounded process. Head 0.34 to 0.38 across eyes. Beak reaching middle coxae. Cornicle 0.29 to 0.41 mm. in length, slender, somewhat curved; pale, slightly dusky at tip; imbricated. Cauda 0.18 to 0.24 mm. long, pale, constricted, and with two hairs on each side.

Apterous oviparous female.—Antenna subequal in length to body; pale, distal half darker; no secondary sensoria. Length of antennal segments: III, 0.30 to 0.36 mm.; IV, 0.16 to 0.21 mm.; V, 0.19 to 0.23 mm.; VI, base 0.10 to 0.14 mm., unguis 0.25 to 0.29 mm. Antennal tubercles gibbous, moderately convergent; distance between them 0.10 to 0.11 mm. Vertex produced forward into a rounded projection. Head 0.36 to 0.38 mm. across eyes. Beak reaching middle coxae.

Cornicle 0.38 to 0.44 mm. in length, slender, somewhat curved, imbricated. Cauda 0.20 to 0.23 mm. long, broad, scarcely constricted, and with two hairs on each side. Numerous sensoria on basal two-thirds of posterior tibia. Areas between sensoria dusky.

Alate male.—Antenna longer than body, dusky; III with 19 to 30 sensoria; IV with 14 to 17 sensoria; V with 7 to 10 sensoria. Length of antennal segments: III, 0.44 to 0.59 mm.; IV, 0.30 to 0.41 mm.; V, 0.33 to 0.40 mm.; VI, base 0.15 to 0.20 mm., unguis 0.40 to 0.58 mm. Antennal tubercles only slightly convergent; distance between them 0.09 to 0.13 mm. Head 0.38 to 0.41 mm. across eyes. Cornicles 0.28 to 0.31 mm. in length, strongly imbricated, slightly curved. Cauda 0.09 to 0.13 mm. long, constricted, and with 2 hairs on each side.

Type.—United States National Museum Catalog No. 52854. Alate and apterous viviparous females, oviparous females, males, and eggs, all collected or reared by H. B. Scammell.

Host.—Cranberry.

Distribution.—New Jersey.

MYZUS SCROPHULARIAE (Thomas)

(Fig. 6, V-Z)

Phorodon scrophulariae Thomas, Ill. State Ent. Rept. 8:72, 1879.

Myzus scrophulariae (Thomas) Hottes and Frison, Ill. State Nat. Hist. Survey Bull. 19: 343, 1931.

Apterous viviparous female.—(From type slide.) Antenna slightly longer than body; hairs distinct; no secondary sensoria. Relative lengths of antennal segments: As III, 31; IV, 22; V, 20; VI, base 8, unguis 20. Antennal tubercles gibbous, strongly convergent; distance between them, when compared with other body measurements, as 6. Head across eyes 29 in proportion to other measurements. Cornicle slightly imbricated, swollen, 2 or 3 striae at tip; flange distinct; length, in proportion to above measurements, as 25. Cauda broadly conical, tip rounded; length, in proportion to above measurements, as 12; 2 hairs on each side.

Type.—Illinois State Natural History Survey collection.

Host.—*Scrophularia nodosa*.

Distribution.—Illinois and California.

With the exception of one record from California by Clark (5, p. 252), this species has not been reported since it was originally described.

MYZUS SENSORIATUS, new species

(Fig. 7, A-C)

Alate viviparous female.—Antenna pale to dusky, shorter than body; I with imbricated projection on inner side; III with 45 to 62 closely set, tuberculate sensoria; IV with 27 to 43; V with 12 to 17. Length of antennal segments: III, 0.45 to 0.56 mm.; IV, 0.26 to 0.46 mm.; V, 0.20 to 0.38 mm.; VI, base 0.10 to 0.15 mm., unguis 0.21 to 0.28 mm. Antennal tubercles prominent, strongly convergent; distance between them 0.06 to 0.08 mm. Head 0.36 to 0.40 mm. across eyes. Thorax brownish yellow, with greenish tinge. Legs dusky, tarsi darker. Veins black, wings slightly fuscous near veins. Abdomen pale greenish. Cornicle 0.28 to 0.33 mm. in length, concolorous with abdomen, swollen, flange distinct, cross imbrications near flange faint. Cauda 0.09 mm. long, broad at base, narrowing abruptly, and with 2 hairs on each side.

Type.—United States National Museum catalog No. 52855. Four alate viviparous females taken by Pergande, May 14, 1906.

Host.—*Crataegus crusgalli*.

Distribution.—District of Columbia.

This species is close to *Myzus eriobotryae* Tissot, but can be distinguished by the unguis being only about twice the length of the base of the sixth antennal segment, whereas in *eriobotryae* it is four to five times as long as the base.

MYZUS VARIANS Davidson

(Fig. 7, D-H)

Myzus varians Davidson, Jour. Econ. Ent. 5: 409, 1912.*Myzus tropicalis* Takahashi, Formosa Dept. Agr. Govt. Research Inst. Rept. 4: 24, 1923.*Myzus clematifoliae* Shinji, Dobuts. Zasshi (Zool. Mag. Tokyo) 36: 369, 1924.

Alate viviparous female.—Antenna considerably longer than body, very dark, conspicuously imbricated; hairs small and inconspicuous; III with 10 to 13 sensoria. Length of antennal segments: III, 0.45 to 0.56 mm.; IV, 0.29 to 0.41 mm.; V, 0.29 to 0.36 mm.; VI, base 0.10 to 0.14 mm., unguis 0.49 to 0.73 mm. Antennal tubercles large, dark, strongly convergent; hairs conspicuous; distance between them 0.08 to 0.10 mm. Head 0.43 to 0.44 mm. across eyes. Beak extending to between anterior and middle coxae. Prothorax with a prominent tubercle. Abdomen with dark bands which sometimes coalesce to form a quadrilateral area. Cornicle 0.34 to 0.41 mm. in length, dusky, cylindrical, curved, imbricated, flange distinct. Cauda 0.13 to 0.16 mm. long, conical, constricted toward tip, and with 2 or 3 hairs on each side.

Apterous viviparous female.—Antenna subequal in length to body, pale, distal ends of segments black; hairs very small; no secondary sensoria. Length of antennal segments: III, 0.34 to 0.40 mm.; IV, 0.21 to 0.30 mm.; V, 0.23 to 0.30 mm.; VI, base 0.11 to 0.13 mm., unguis 0.45 to 0.65 mm. Antennal tubercles large, imbricated, strongly convergent, with conspicuous capitate hairs; distance between them 0.06 to 0.09 mm. Head 0.36 to 0.43 mm. across eyes. Beak extending to between middle and posterior coxae. Cornicle 0.41 to 0.46 mm. in length, curved, tapering, imbricated, tip black, flange distinct. Cauda 0.15 to 0.18 mm. long, conical, and with three hairs on each side.

Type.—United States National Museum catalog No. 52856. The type of *tropicalis* Takahashi is in the Taiwan (Formosa) Department of Agriculture, Government Research Institute. The location of the type of *clematifoliae* Shinji is unknown to the writer.

Hosts.—Clematis and peach.

Distribution.—California, Taiwan, Loochoo, and Japan.

This species migrates between clematis and peach. The latter plant is often seriously injured, the curled leaves taking on a reddish tinge. The species is probably of oriental origin.

MYZUS WAKIBAE (Hottes), new combination

(Fig. 7, I-P)

Dactynotus wakibae Hottes, Biol. Soc. Wash. Proc. 47: 6, 1934.

Alate viviparous female.—Brown. Antenna slightly longer than body, imbricated; hairs inconspicuous; III with 10 conspicuous, but small, sensoria. Length of antennal segments: III, 0.59 mm.; IV, 0.46 to 0.49 mm.; V, 0.41 to 0.46 mm.; VI, base 0.15 to 0.18 mm., unguis 0.70 to 0.76 mm. Antennal tubercles large, moderately convergent; distance between them 0.10 mm. Head 0.49 mm. across eyes. Cornicle 0.50 mm., long, slender, conspicuously imbricated, a few reticulations near tip. Cauda 0.24 mm. long, constricted, tip rounded, 2 hairs on each side.

Apterous viviparous female.—Brown. Antenna much longer than body, lighter at base, imbricated; hairs very inconspicuous; no secondary sensoria. Length of antennal segments: III, 0.48 mm.; IV, 0.36 mm.; V, 0.36 to 0.38 mm.; VI, base 0.15 mm., unguis 0.68 to 0.70 mm. Antennal tubercles large, conspicuously convergent; distance between them 0.10 mm. A very slight frontal protuberance between antennal tubercles. Head 0.49 mm. across eyes. Cornicle 0.50 mm. long, slender, not swollen, imbricated, not reticulated, lighter in color than in alate viviparae. Cauda 0.23 mm. long, conical, scarcely constricted, and with two hairs on each side.

Type.—United States National Museum catalog No. 50361.

Host.—*Pedicularis canadensis* L.

Distribution.—Colorado.

This species is unusual in that the antennae of the apterous form are much longer than the body.

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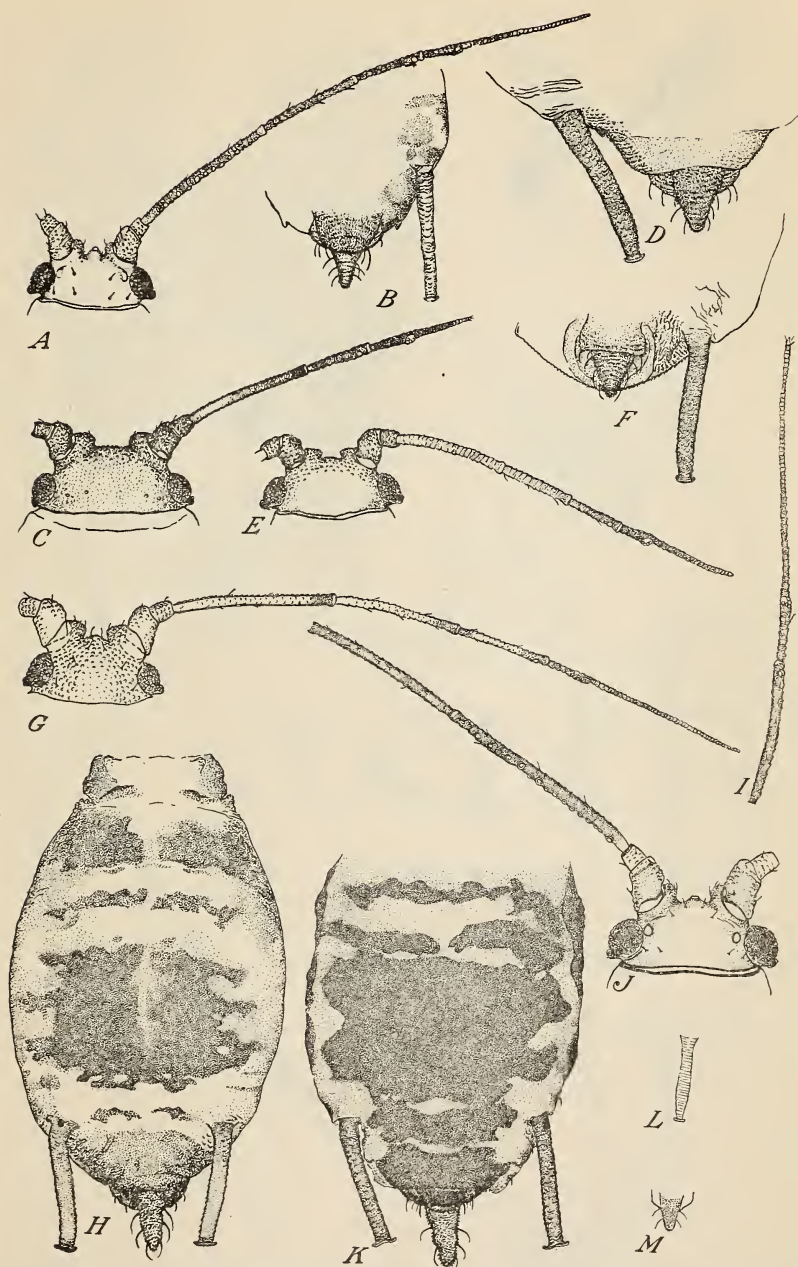


FIGURE 1.—A-F, *Myzus cerasi*: A, Head and antenna, and B, cornicle and cauda, of alate viviparous female; C, head and antenna, and D, cornicle and cauda, of stem mother; E, head and antenna, and F, cornicle and cauda, of apterous viviparous female. G-K, *Myzus circumflexus*: G, Head and antenna, and H, abdomen, of apterous viviparous female; I and J, head and antenna, and K, abdomen, of alate viviparous female. L and M, *Myzus eriobotryae*: L, Cornicle, and M, cauda, of alate viviparous female.

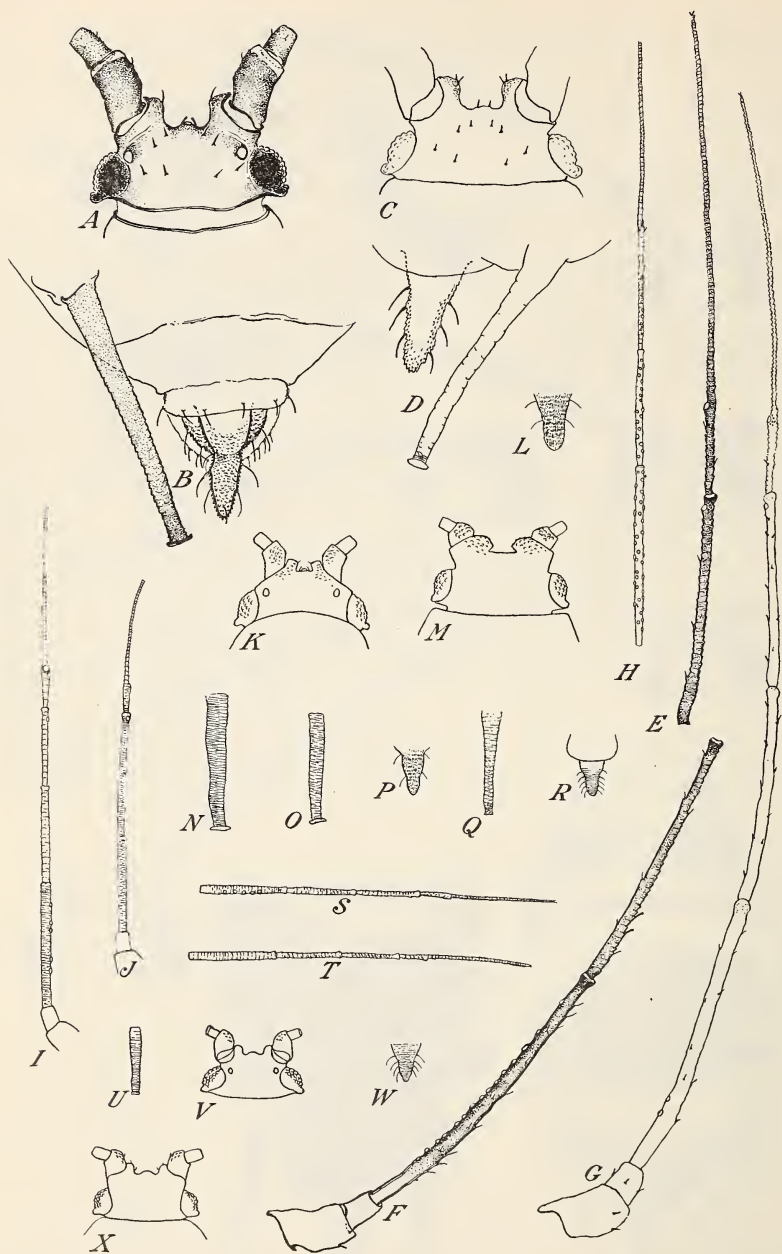


FIGURE 2.—A-G, *Myzus convolvuli*: A, Head, B, cornicle and cauda, and E and F, antenna, of alate viviparous female; C, head, D, cornicle and cauda, and G, antenna, of apterous viviparous female. H, *Myzus eriobotryae*: Antenna of apterous viviparous female. I-P, *Myzus langei*: I, Antenna, K, head, O, cornicle, and P, cauda, of alate viviparous female; J, antenna, L, cauda, M, head, and N, cornicle, of apterous viviparous female. Q-X, *Myzus leucocrini*: Q, Cornicle, R, cauda, T, antenna, and X, head, of apterous viviparous female; S, antenna U, cornicle, V, head, and W, cauda, of alate viviparous female.

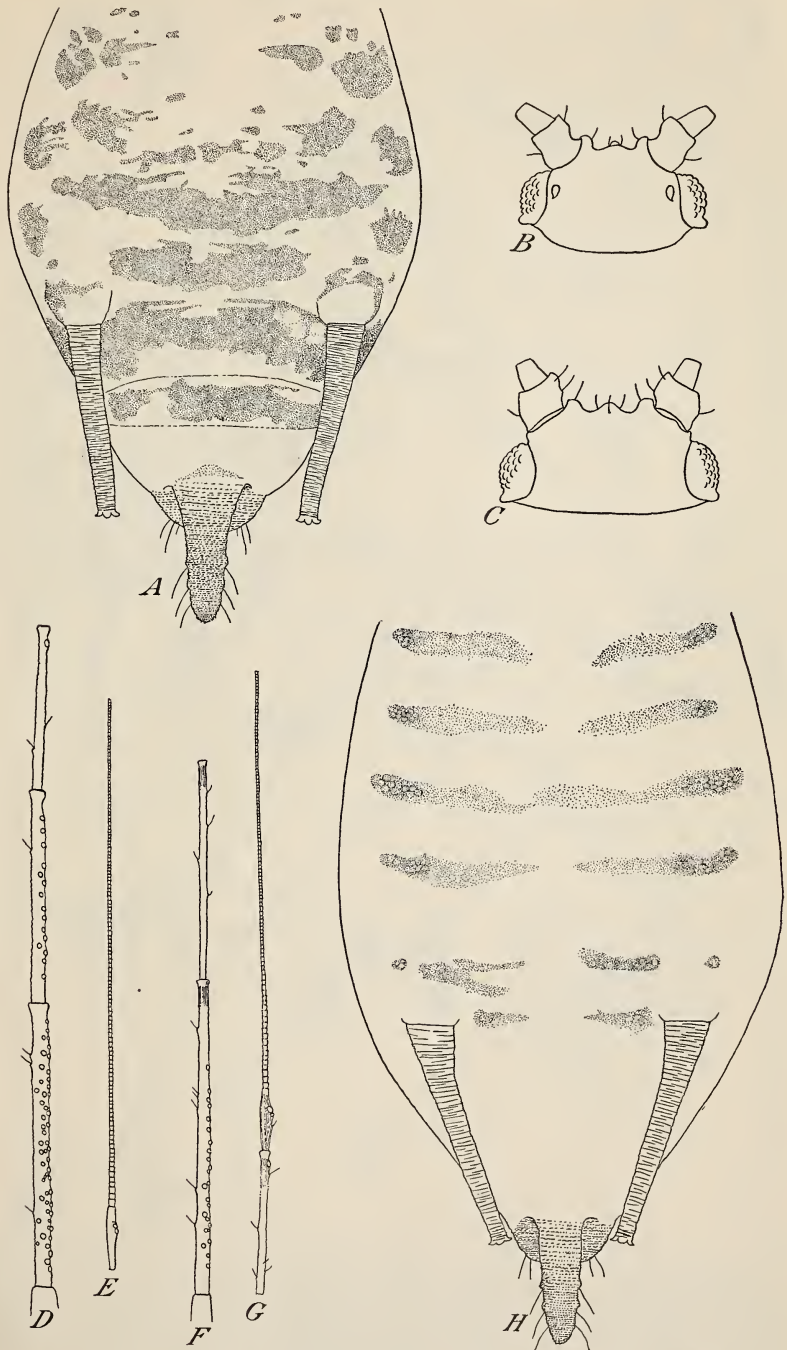


FIGURE 3.—A-H, *Myzus hieracii*: A, Abdomen, B, head, and D and E, antenna, of alate viviparous female; C, head, F and G, antenna, and H, abdomen, of apterous viviparous female.

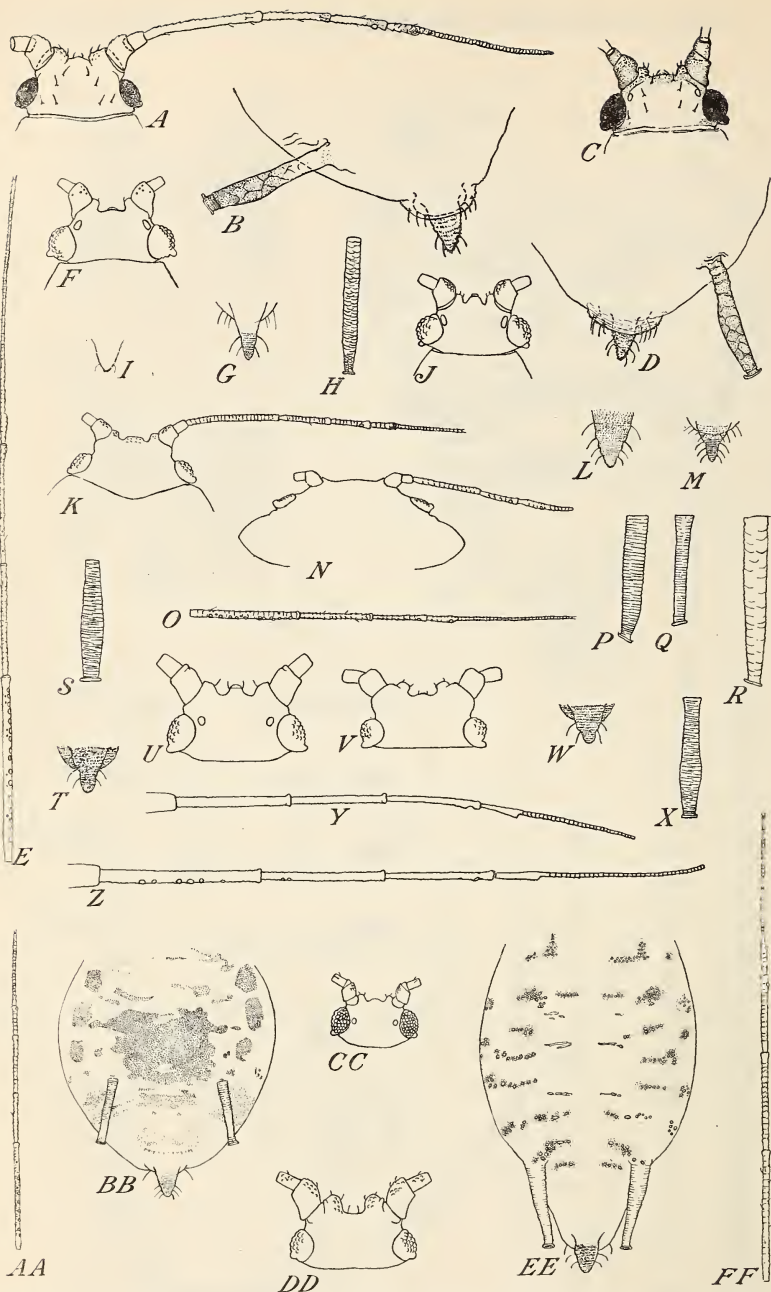


FIGURE 4.—A-D, *Myzus ligustri*: A, Head and antenna, and B, cornicle and cauda, of apterous viviparous female; C, head, and D, cornicle and cauda, of alate viviparous female. E-H, *Myzus lilii*: E, Antenna, F, head, G, cauda, and H, cornicle, of alate viviparous female. I-R, *Myzus lythri*: I, Cauda, N, head and antenna, and P, cornicle, of stem mother; J, head, M, cauda, O, antenna, and Q, cornicle, of alate viviparous female; K, head and antenna, L, cauda, and R, cornicle, of apterous viviparous female. S-Z, *Myzus monardae*: S, Cornicle, T, cauda, U, head, and Z, antenna, of alate viviparous female; V, head, W, cauda, X, cornicle, and Y, antenna, of apterous viviparous female. AA-FF, *Myzus ornatus*: AA, Antenna, BB, abdomen, and CC, head, of alate viviparous female; DD, head, EE, abdomen, and FF, antenna of apterous viviparous female.

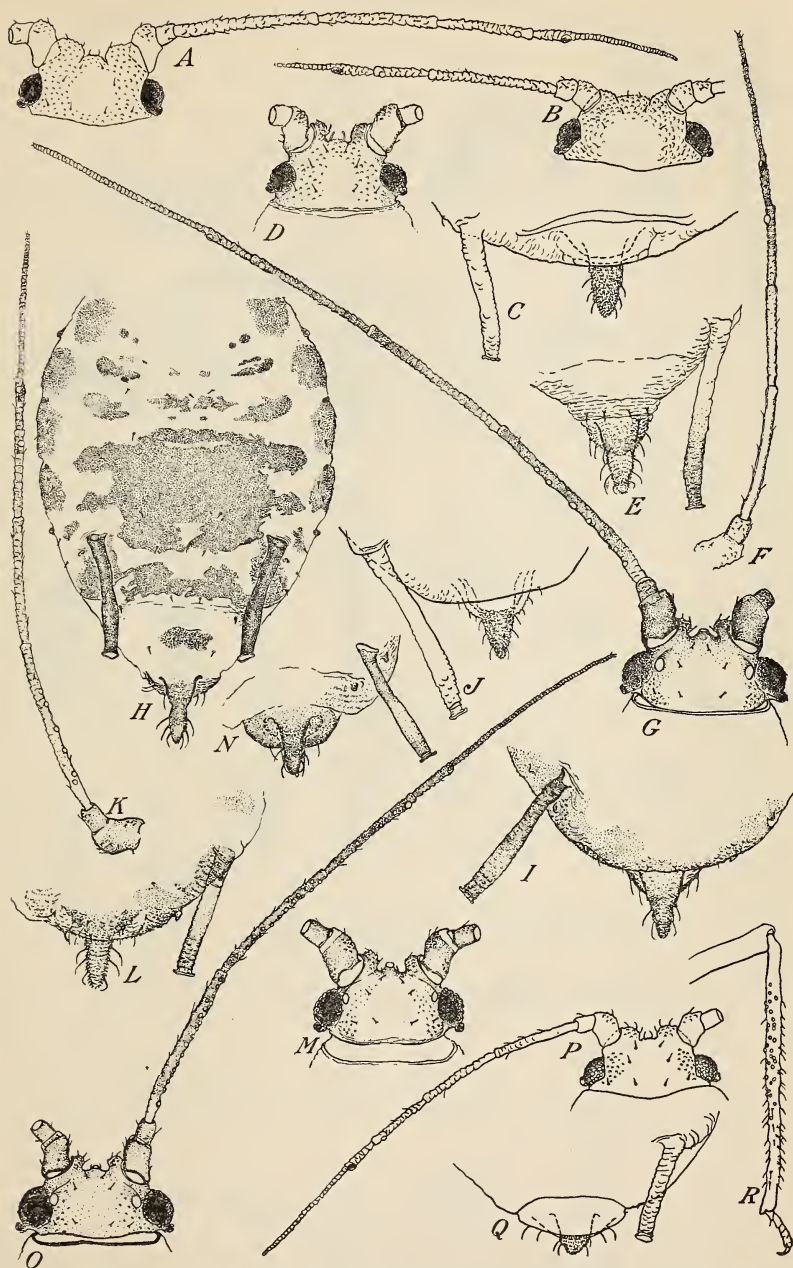


FIGURE 5.—A-R, *Myzus persicae*: A, Head and antenna, and J, cornicle and cauda, of apterous viviparous female from primary host; B, head and antenna, and C, cornicle and cauda, of stem mother; D, head, E, cornicle and cauda, and F, antenna, of apterous viviparous female from summer host; G, head and antenna, H, abdomen, and I, cornicle and cauda, of fall migrant; K, antenna, L, cornicle and cauda, and M, head, of alate viviparous female from primary host; N, cornicle and cauda, and O, head and antenna, of male; P, head and antenna, Q, cornicle and cauda, and R, posterior tibia, of oviparous female.

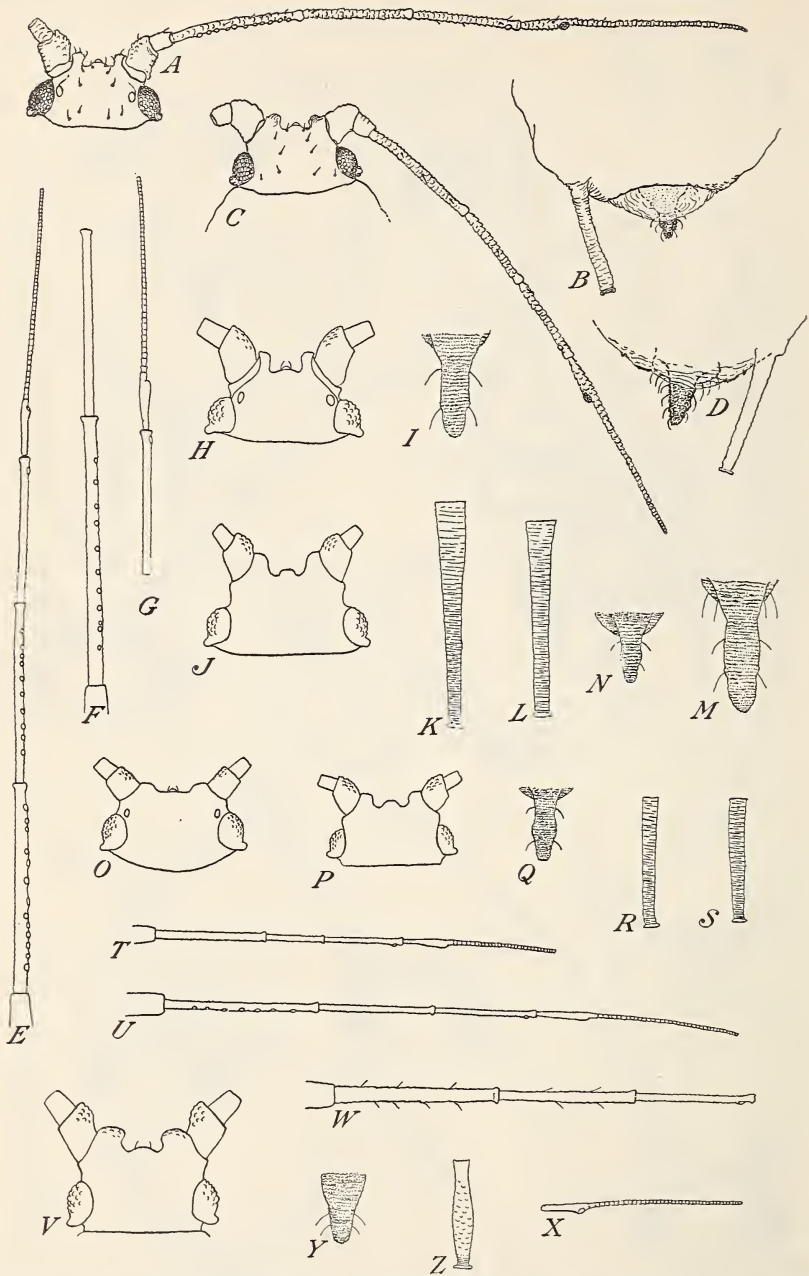


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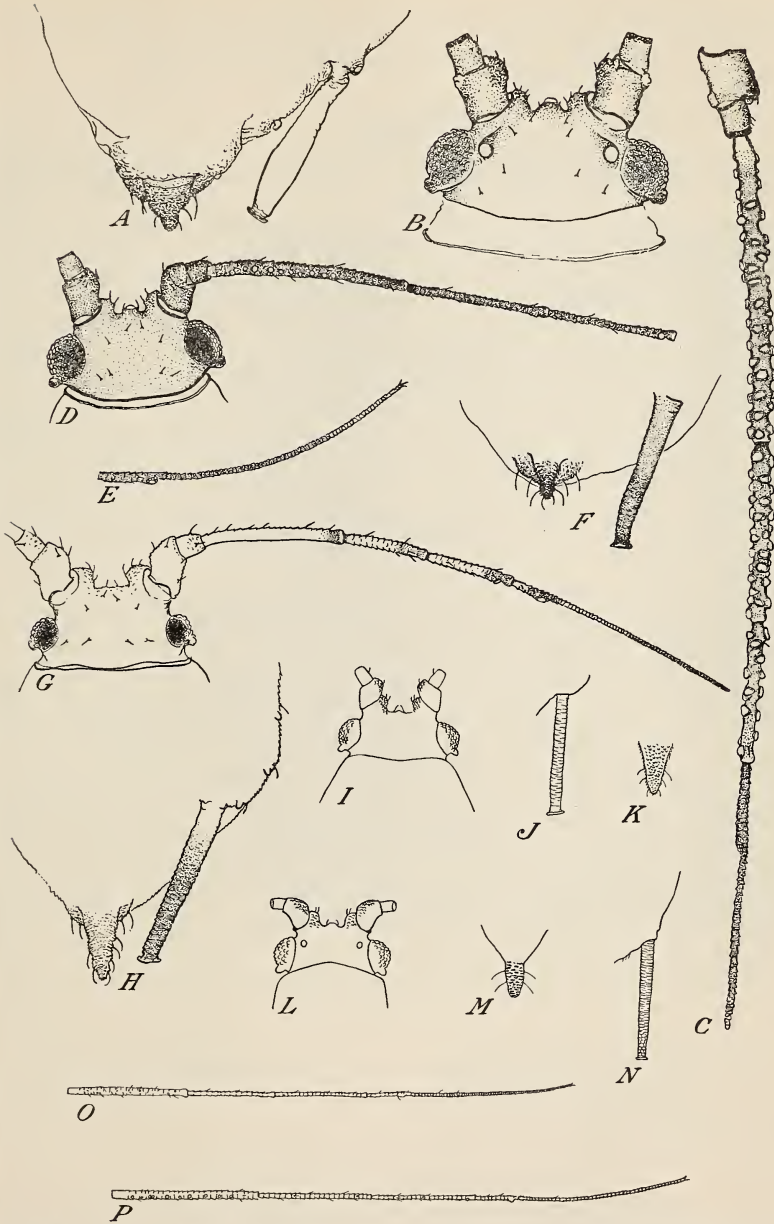


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